EDISON ELECTRIC INSTITUTE BULLETIN

MARCH, 1936

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EDISON ELECTRIC INSTITUTE

STATISTICAL DATA OF THE ELECTRIC LIGHT AND POWER INDUSTRY

Compiled Monthly by the Edison Electric Institute—Covers 100% of the Industry

DURING THE MONTH OF JANUARY (Preliminary)

	1936	1935	%
Kilowatt-hours Generated* (net)			
By Fuel	5,515,500,000	4,700,752,000	+17.3
By Water Power	3,104,345,000	3,024,139,000	+ 2.7
Total Kilowatt-hours Generated	8,619,845,000	7,724,891,000	+11.6
Additions to Supply			
Energy Purchased from Other Sources	151,816,000	141,109,000	+ 7.6
Net International Imports	73,420,000	79,264,000	− 7.4
Total	225,236,000	220,373,000	+ 2.2
Deductions from Supply			
Energy used in Electric Railway Departments	57,241,000	61,227,000	− 6.5
Energy used in Electric and Other Departments	123,730,000	121,524,000	+ 1.8
Total	180,971,000	182,751,000	− 1.0
Total Energy for Distribution	**8,664,110,000**	**7,762,513,000**	**+11.6**
Energy Lost in Transmission, Distribution, etc.	**1,385,831,000**	**1,293,782,000**	**+ 7.1**
Kilowatt-hours Sold to Ultimate Consumers	**7,278,279,000**	**6,468,731,000**	**+12.5**
Sales to Ultimate Consumers (kw-hrs.)			
Domestic Service	1,466,499,000	1,316,743,000	+11.4
Commercial—Small Light and Power (Retail)	1,402,781,000	1,245,351,000	+12.6
Commercial—Large Light and Power (Wholesale)	3,566,771,000	3,135,330,000	+13.8
Municipal Street Lighting	234,266,000	222,089,000	+ 5.5
Railroads—Street and Interurban	446,101,000	431,009,000	+ 3.5
Railroads—Electrified Steam	100,413,000	67,009,000	+49.9
Municipal and Miscellaneous	61,448,000	51,200,000	+20.0
Total Sales to Ultimate Consumers	7,278,279,000	6,468,731,000	+12.5
Total Revenue from Ultimate Consumers	$179,140,500	$170,101,000	+ 5.3

DURING TWELVE MONTHS ENDING JANUARY 31st

Kilowatt-hours Generated* (net)			
By Fuel	56,766,065,000	53,650,934,000	+ 5.8
By Water Power	36,457,243,000	31,558,947,000	+15.5
Total Kilowatt-hours Generated	93,223,308,000	85,209,881,000	+ 9.4
Purchased Energy (net)	3,027,129,000	2,999,319,000	+ 0.9
Energy Used in Electric Railway and Other Departments	1,928,574,000	2,013,721,000	− 4.2
Total Energy for Distribution	**94,321,863,000**	**86,195,479,000**	**+ 9.4**
Energy Lost in Transmission, Distribution, etc.	**15,957,567,000**	**14,855,777,000**	**+ 7.4**
Kilowatt-hours Sold to Ultimate Consumers	**78,364,296,000**	**71,339,702,000**	**+ 9.8**
Total Revenue from Ultimate Consumers	**$1,930,116,300**	**$1,845,076,600**	**+ 4.6**
Important Factors			
Percent of Energy Generated by Waterpower	39.1%	37.0%	
Domestic Service (Residential Use)			
Average Annual Consumption per Customer (kw-hr)	678	634	+ 6.9
Average Revenue per kw-hr (Cents)	4.99¢	5.28¢	− 5.5
Average Monthly Bill per Domestic Customer	$2.82	$2.79	+ 1.1

BASIC INFORMATION AS OF JANUARY 31st

Generating Capacity (kw)—Steam	24,026,700	23,802,800	
—Waterpower	8,995,700	8,947,500	
—Internal Combustion	497,300	500,900	
Total Generating Capacity in Kilowatts	33,519,700	33,251,200	
Number of Customers**			
Farms in Eastern Area (Included with Domestic)	(578,720)	(533,997)	
Farms in Western Area (Included with Commercial—Large)	(216,550)	(208,226)	
Domestic Service	21,080,592	20,487,399	
Commercial—Small Light and Power	3,720,269	3,745,109	
Commercial—Large Light and Power	507,058	503,310	
Other Ultimate Consumers	65,764	71,923	
Total Ultimate Consumers	25,373,683	24,807,741	

* By courtesy of the U. S. Geological Survey with deductions for certain plants not considered Electric Light and Power Enterprises.
** Subject to revision on completion of state by state tabulation.

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EDISON ELECTRIC INSTITUTE BULLETIN

Volume IV MARCH, 1936 No. 3

Institute's 1936 Convention to be Held in St. Louis Municipal Auditorium

DELEGATES to the E.E.I. Convention this summer can look forward to pleasantly cool meeting rooms, since an air-conditioned building —the new Municipal Auditorium in St. Louis—has been selected for the 1936 convention. The entire building is air conditioned. Air, temperature, light and seats all being comfort details which have been worked out to the nth degree in this ultra modern convention building.

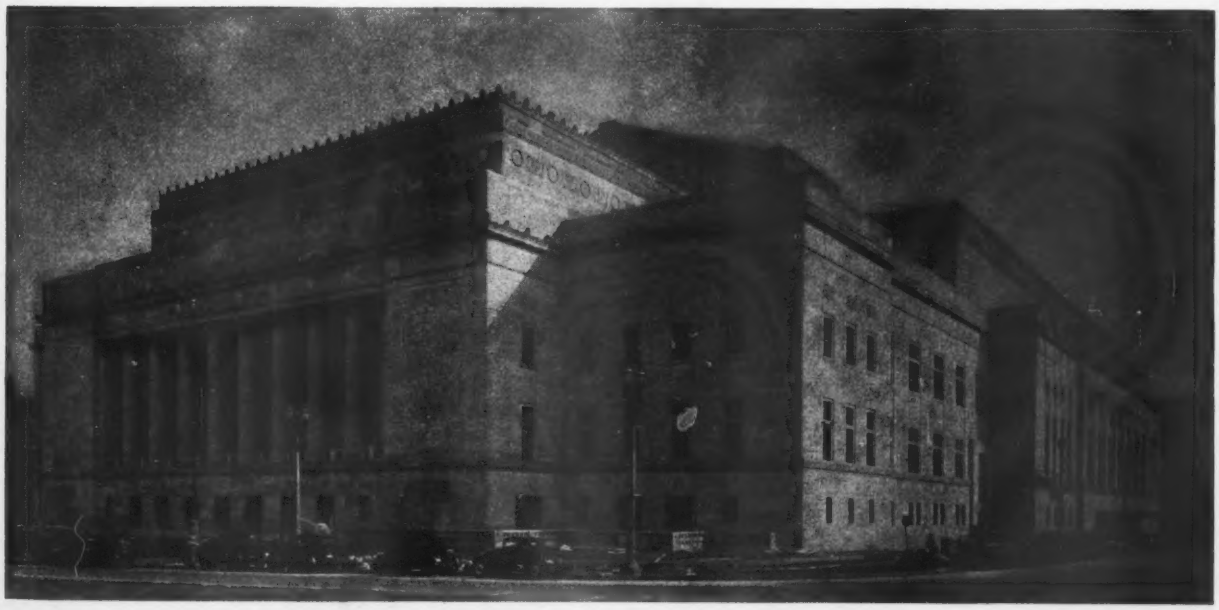
The plans for the Convention, which will continue from June 1st to 4th inclusive, are well under way and the program is rapidly assuming form. Negotiations are being held with the railroads for special reduced rates to St. Louis from all sections of the country, and transportation information and reservation blanks will be supplied early in April to all member companies. Information will include rates and schedules, for both railway and air service. Information concerning St. Louis' splendid hotels will also be supplied at an early date.

The Municipal Auditorium, completed last year and representing an investment of nearly $7,000,000, is outstanding among convention halls in the country. Facing the Memorial Plaza in the heart of the downtown section of the city, this beautiful structure contains an opera house, capable of seating 3,500 persons, a spacious exhibition hall, and numerous smaller halls and committee rooms for smaller meetings. The general sessions of the Convention will be held in the opera house of the Auditorium.

An extensive Arena, seating upwards of 12,500 persons, is also housed in the Municipal Auditorium, which predominates the group of public buildings overlooking St. Louis' new Civic Center, one of the most outstanding in the country. Other buildings in the group are the new Federal Building, the Civil and Municipal Courts buildings, City Hall and Public Library. They all face Memorial Plaza, a newly developed part of seven square blocks.

The air-conditioning arrangements of the Auditorium provide for the introduction of a million cubic feet of fresh air per minute into 14 fan rooms, which is conveyed to every part of the building at the rate of 30 cubic feet per minute per person when the space is filled to capacity. The air is taken in at roof elevation—filtered by means of

(*Continued on page* 100)



Municipal Auditorium, St. Louis, Mo. To be the scene of the Institute's 1936 Convention

KNIGHT OF THE SPUR

Original Etching by Orie Van Rye,

District Engineer, New England Power Association, Providence, R. I.

1936

National Coordination in Selling

Suggestions in Pictures

By C. E. Greenwood
Commercial Director, E. E. I.

FOR THE past ten years the commercial watchword in our leading utility associations has been INDUSTRIAL ACTION. First, in the National Electric Light Association, and then expanding new business development in the Edison Electric Institute, one national coordinated industrial program has followed another. Today there are four such national activities moving forward aggressively and constructively in joint sponsorship with manufacturer groups. These are the Kitchen Modernizing Program, Electrical Housewares, Better Light-Better Sight and the Running Water programs.

There was a time when we bounded electric utility load-building interests with four associations — manufacturers, wholesalers, electrical contractor-dealers, and utilities. But the scope of our promotional efforts have widely broadened, and today we have a whole score of association groups outside the four leading ones that form the nucleus of development in the electrical industry, that are actively participating, and are intensely interested in the Institute's business-getting plans. Other promotional undertakings now under consideration will still add to this list.

The "baby" of these national programs, but a husky one for less than six months of planning and action, is the National Kitchen Modernizing Bureau, headed by George E. Whitwell of The Philadelphia Electric Company. Twenty thousand *plan books* have carried the story from coast to coast; 18 Regional Directors have started local organization effort. Stimulation of LOCAL COOPERATIVE ELECTRICAL DEVELOPMENT is the basic objective of all our national movements. The national activity includes a complete plan for attacking the particular market, selling suggestions, selling aids in promotional material, the national slogan and design, field work, and a general mobilization of all industries concerned. Coordination is a fundamental requirement.

Dr. G. W. Allinson, Field Representative for the Commercial Department of the Institute, has addressed a score of meetings in the West, Middle West and South during the past two months, and has outlined in detail the many advantages of the Kitchen Modernizing Program. Portland, Ore.; Omaha, Neb.; Boston, Mass.; Kansas City, Mo.; Denver, Colo.; Indianapolis, Ind.; Knoxville, Tenn.; Atlanta, Ga., and Washington, D. C., are striking examples of places where kitchen modernizing by electricity is making rapid progress. There is illustrated on the next two pages steps in forming a local bureau, suggested activities for the local program and sales aids for promoting the activity, as taken from the *Plan Book*, which is now ready for distribution and on which orders are being filled. A useful booklet of *Kitchen Plans* is in production and will be available shortly to utilities and local bureaus.

The favorable reaction of utility commercial executives to the general plan which has been prepared by the Plan Committee in conjunction with advertising counsel, is reflected in the comments which have been received recently by Mr. Whitwell, a few of which are quoted here:

"May I congratulate you upon the fine presentation of the plan which you have prepared and which I know will meet with success?"—C. L. Law, Executive Assistant, The New York Edison Co.

"I want to congratulate you on an excellent undertaking and predict that wonderful progress is possible under these plans."—A. V. S. Lindsley, Sales Manager, Connecticut Light & Power Co.

"The national plan seems particularly well thought out and we here in Pennsylvania Power & Light Company plan to cooperate actively. Its flexibility should make it universally attractive."—N. G. Reinicker, Vice-President & General Manager, Pennsylvania Power & Light Co.

"I think the whole idea is very fine and we are going to support it enthusiastically."—W. N. Clark, President, Southern Colorado Power Co.

"The objectives of the Bureau are very clearly set forth and I am of the opinion that under your leadership the activity should secure the hearty cooperation of the various interests."—A. E. Ward, The Utility Management Corp.

"Our first Kitchen Modernizing meeting was a very enthusiastic one and I am sure you will find that Denver will soon have one of the leading Bureaus of the nation."—J. T. Coatsworth, Chairman, Denver Electric Kitchen Modernizing Bureau.

"I just wanted to let you know that this company has inaugurated a Kitchen Modernizing Bureau and we expect to start work very shortly."—L. L. Edgar, Vice-President, The Edison Electric Illuminating Co. of Boston.

"I know that the activity is being enthusiastically received in California and I am sure that it will be just as enthusiastically received in the Pacific Northwest."—A. C. McMicken, Regional Director for Oregon and Western Washington.

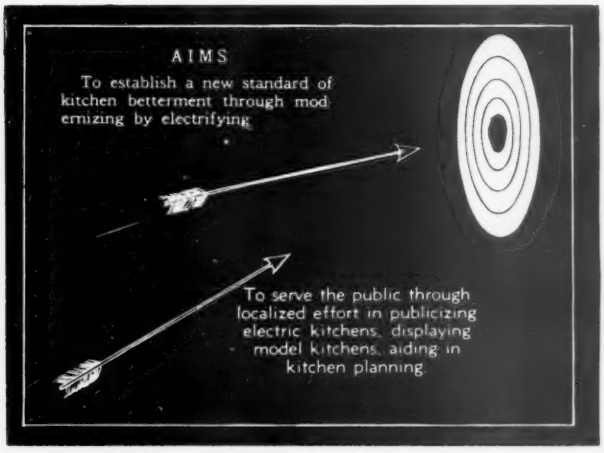
MODERNIZE—ELECTRIFY YOUR KITCHEN

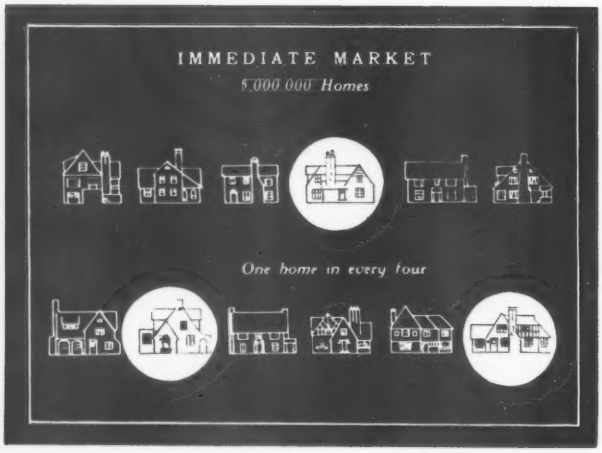
FIRST STEPS IN FORMING A LOCAL BUREAU

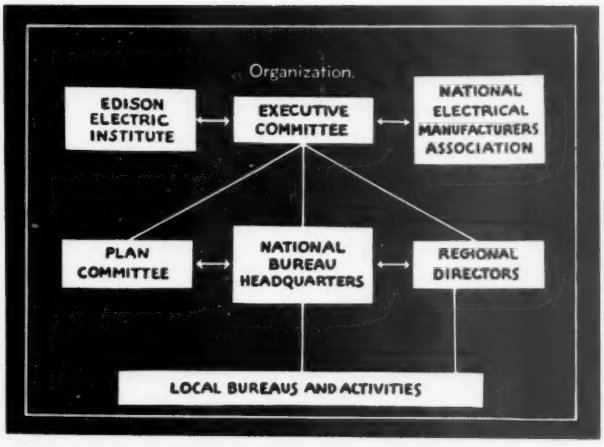
1. One or more preliminary group meetings
2. A general meeting for active formation and election of officers
3. A written plan
4. Membership and Funds
5. Aligning budget
6. Procedure according to plan

SUGGESTED ACTIVITIES FOR THE LOCAL PROGRAM

1. Advertise kitchen modernizing in newspapers—by word of mouth—in every practical way
2. Establish one or more model kitchens, open to the public
3. Offer kitchen planning service in some form, no matter how limited
4. Provide a central information office if possible
5. Work in step with the National Bureau—use the aids offered


AIMS
To establish a new standard of kitchen betterment through modernizing by electrifying
To serve the public through localized effort in publicizing electric kitchens, displaying model kitchens, aiding in kitchen planning



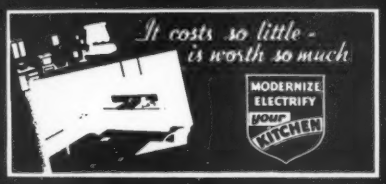


MODERNIZE–ELECTRIFY YOUR KITCHEN

Sales Aids for Local Organizations and Their Individual Members

THE PLAN BOOK

— a guide for local Bureaus, outlining organization, aims, plans and illustrating the several available aids for local use. Every Bureau member should have a copy — which will be sent free on request.



OUT DOOR POSTER

full size — 24 sheet poster special local imprint if desired.

WINDOW DISPLAY

20" x 28" — colorful cardboard cut-out with miniature Electric Equipment in three dimensions.

An attraction — getting center piece for any display.

Shipped flat — can be set up in one minute.

COUNTER AND WINDOW SIGN

13½" x 16", heavy cardboard cut-out, blue and gold.

RADIO BROADCASTING

- 13 addresses by leading home economists
- each talk designed for 15 minute broadcast
- available in mimeographed form. Electrical transcriptions later if sufficient demand.

BOOK of KITCHEN PLANS

— and omnibus of practical kitchen plans compiled with the assistance of manufacturers magazines and architects.

— an aid to local kitchen planning service

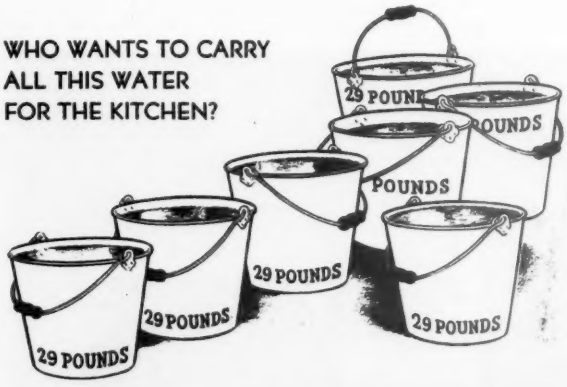
RUNNING WATER—LIFE IN THE COUNTRY

The Electric Water Systems Council in its promotion of running water in rural and semi-rural homes offered to supply a booklet—LIFE IN THE COUNTRY—to utility companies that would agree to deliver each copy by salesmen or other employee rather than place in the mail.

The reason for this requirement of distribution is obvious. The booklet presents a subtle story of the many advantages of running water in the home and why every family deserves it. A supply of approximately 125,000 was made available through the cooperation

of the pump manufacturers, and as requests exceeded a quarter of a million it is to be regretted that allotments had to be cut down.

There is hope that a continued upward curve of sales of electric water systems, such as recorded in 1935, will influence a further production for a second printing and distribution. Sample pages illustrated are indicative of the human interest approach to dwellers in rural homes, and the visualization of why an investment should be made in an electric water system.



37 TONS EVERY YEAR!

Seven buckets of water—count 'em!—that's the number used in the kitchen of the average family in the course of one day! With the average bucketful weighing 29 pounds, someone must pump and carry 37 tons, for the kitchen alone, in one year!

JUST TRY THIS!

Go get a bucket. Pump it full. Up and down, up and down! Carry it into the kitchen. Now carry out a bucketful. Throw it away. Pump another bucketful. Go on—do it seven times, right straight ahead! That will give you some idea of the work, time and energy the family uses toting water in and out.

SHE DESERVES RUNNING WATER IN THE KITCHEN!

Look at the picture above. An electric pump delivers the water right into the kitchen—or wherever it is needed! And it costs far less than most folks think.

get running water *first*

"OH, BOY! THIS IS THE LIFE!"

This healthy little fellow lives in a home where there's lots of hot and cold water always on tap. He gets his bath daily and *it's never a chilly one.*

RUNNING WATER GUARDS THE FAMILY'S HEALTH!

The greatest benefit which *Running Water* brings to any family is better health. Ruddy cheeks, bright, laughing eyes — cleanliness helps to produce these.

With a modern bathroom in the house, every member of the family, both grown folks and children find a bath a lot of fun instead of a "Saturday night" chore.

Running Water eliminates unsanitary slop pails. It prevents danger from colds through trips to the pump and "out back" in cold and rain and snow. Year in, year out—it guards the family's health!

Two Pages from "Life in the Country"

ELECTRICAL HOUSEWARES PROGRAM

—The spring concentration in the national program on ELECTRICAL HOUSEWARES, to inspire greater local activity in the promotion of the small appliance market, has been announced. April is National Electrical Housekeeping Month. A poster for Electrical Housekeeping Month is illustrated here. You will note that some lucky dealers are to enjoy a trip to Havana because they had a display of appliances, manufactured by contributors to the program, built around this poster that excelled, in the opinion of competent judges. Following the practice in other contests, there will be a prize in each class—departmentalized stores, utilities, and general dealers.

Front and Back of the large April Housewares Poster

If the well-styled, modern and useful small appliances are displayed to advantage by all classes of dealers, and adequately advertised locally as well as nationally, there is a waiting public to purchase these items for the convenient electrical service they render. Also available are newspaper mats of the poster in three different sizes, and a small sticker stamp for correspondence and packages.

All utility companies are urged to participate, in cooperation with their dealers, in this April concentration.

Looking forward, it is well to bear in mind that June is National Electrical Wedding Month.

T
Question: WHAT is National ELECTRICAL HOUSEKEEPING MONTH?
Answer: National ELECTRICAL HOUSEKEEPING MONTH is a great co-operative merchandising event sponsored by leading electrical housewares manufacturers and Edison Electric Institute in the interests of all electrical housewares dealers.
Question: WHEN is National ELECTRICAL HOUSEKEEPING MONTH?
Answer: April is National ELECTRICAL HOUSEKEEPING MONTH.
Question: WHICH electrical appliances are included in National ELECTRICAL HOUSEKEEPING MONTH?
Answer: Included in National ELECTRICAL HOUSEKEEPING MONTH are the smaller electrical appliances commonly referred to as "Electrical Housewares" which are produced by manufacturers contributing to the Electrical Housewares Program.
Question: WHO may participate in National ELECTRICAL HOUSEKEEPING MONTH?
Answer: Every central station, department store, and dealer in electrical appliances in America is cordially invited to participate in National ELECTRICAL HOUSEKEEPING MONTH. There is no obligation of any kind.
Question: WHY should every merchandiser of electrical housewares take an active part in National ELECTRICAL HOUSEKEEPING MONTH?
Answer: National ELECTRICAL HOUSEKEEPING MONTH will witness the intensive promotion of electrical housewares by virtually every important electrical manufacturer, distributor, and dealer in America. The cumulative effect of this co-operative drive—the result of this giant co-ordinated promotion—will be INCREASED SALES! But these increased sales will come ONLY to those who tie in their own sales and advertising activities with National ELECTRICAL HOUSEKEEPING MONTH. Do your part! Get your share of the PROFITS!
CONTRIBUTING MANUFACTURERS
American Electrical Heater Co.
General Electric Company
Hamilton-Beach Mfg. Company
Knapp-Monarch Company
Landers, Frary & Clark
Manning-Bowman & Co.
Proctor & Schwartz Electric Co.
Robeson Rochester Corporation
Swartzbaugh Manufacturing Co.
The Silex Company
Waters-Genter Company
Westinghouse Electric & Mfg. Co.
Three
TO
HAVANA
CONTEST RULES
HOW TO TIE IN WITH NATIONAL
ELECTRICAL Housekeeping MONTH
is Electrical Housekeeping Month

Reference Chart—Electric Refrigerator Sales—Household Models Only

By Years 1931-1935 and Twelve Months of 1935

	Years					Months of 1935—Revised Figures											
	1931	1932	1933	1934	1935	January	February	March	April	May	June	July	August	September	October	November	December
Total United States	948,676	769,666	1,065,105	1,372,526	1,590,023	97,425	121,526	213,464	266,931	244,602	161,525	154,227	110,161	53,622	43,706	46,930	75,904
Maine	5,687	5,027	5,699	7,044	7,963	376	586	1,138	1,377	1,569	936	1,004	467	207	90	98	138
New Hampshire	3,797	2,771	3,900	4,884	5,807	221	389	795	986	1,149	759	637	296	263	76	105	131
Vermont	3,271	2,315	2,767	2,944	3,552	92	282	516	576	687	466	463	204	118	46	14	88
Massachusetts	39,792	34,103	53,436	52,322	66,972	3,431	5,407	7,879	9,847	11,478	7,038	6,673	5,174	2,669	1,845	2,238	3,293
Rhode Island	5,663	6,930	9,177	8,007	8,196	399	628	1,087	1,360	1,309	958	809	693	347	123	253	200
Connecticut	18,992	16,374	17,740	18,786	24,767	288	2,167	2,973	4,299	3,678	2,211	3,109	2,909	1,075	367	561	630
Total New England	77,202	67,520	92,719	93,987	117,257	5,307	9,466	14,388	18,445	19,870	12,368	12,695	9,743	4,679	2,547	3,269	4,480
New York	185,226	186,536	205,383	190,055	196,441	8,702	11,626	19,059	27,601	28,477	20,009	20,577	21,426	12,628	8,058	7,421	10,857
New Jersey	55,156	42,774	50,654	59,868	70,344	3,222	3,888	10,047	10,715	12,109	7,890	6,717	4,436	2,634	1,809	2,881	3,996
Pennsylvania	78,117	70,217	103,564	121,971	129,654	5,212	10,814	22,274	19,201	18,103	12,587	12,932	7,702	3,760	4,657	4,454	7,958
Total Middle Atlantic	316,499	299,527	359,601	371,884	396,439	17,136	26,328	51,380	57,517	58,689	40,486	40,226	33,564	19,022	14,524	14,756	22,811
Ohio	50,558	38,503	69,328	91,321	99,266	8,611	7,411	13,225	16,260	13,354	9,490	10,002	6,032	2,967	2,634	4,607	4,673
Indiana	24,829	14,011	22,863	35,551	40,488	2,962	3,270	6,069	6,790	5,775	4,202	4,401	2,620	857	728	1,433	1,381
Illinois	92,472	56,790	72,446	108,333	118,921	7,216	7,827	16,513	20,789	19,392	12,381	10,670	8,370	2,358	2,933	2,955	6,917
Michigan	26,477	25,443	33,694	54,092	69,942	5,212	6,018	10,042	11,263	9,555	5,677	5,540	5,833	1,824	1,663	2,869	5,199
Wisconsin	12,289	10,088	17,984	21,356	26,928	1,661	2,057	3,733	5,001	4,255	2,326	2,273	2,752	547	486	633	1,205
Total East No Central	208,825	144,835	216,315	310,653	354,945	24,909	26,583	49,582	60,103	52,330	34,076	32,886	25,607	8,553	8,444	12,497	19,375
Minnesota	14,646	13,950	14,943	17,897	22,927	1,480	2,558	2,799	4,823	3,858	1,643	2,743	200	704	342	320	1,457
Iowa	11,460	9,364	14,013	20,677	25,515	1,859	2,932	4,262	4,692	3,786	2,530	2,308	1,844	342	327	289	344
Missouri	36,845	26,279	37,270	53,760	48,289	5,354	4,413	8,958	8,838	5,348	3,745	4,496	1,971	1,174	553	1,527	1,912
North Dakota	1,806	1,423	1,876	3,223	4,205	175	345	553	777	934	496	400	262	62	35	29	137
South Dakota	1,888	1,223	2,546	4,350	5,363	497	400	929	986	743	607	564	299	69	85	41	143
Nebraska	7,894	5,952	8,746	14,477	17,441	2,193	1,609	2,293	3,514	2,508	1,627	1,491	760	233	177	321	715
Kansas	9,498	7,400	12,145	21,541	20,156	1,442	1,721	3,913	4,057	2,512	1,938	1,892	969	249	188	478	497
Total West No Central	84,037	65,591	91,539	135,925	143,896	13,000	14,278	23,707	27,687	19,689	12,586	13,894	6,305	2,833	1,707	3,005	5,205
Delaware	1,887	1,970	2,343	3,083	3,463	144	318	677	641	484	338	340	66	101	96	34	224
Maryland					22,853												
Dist of Columbia	28,748	26,095	27,432	38,595	12,276	1,236	1,744	3,765	4,369	3,474	2,478	1,991	1,326	596	451	448	975
Virginia	14,238	12,831	15,341	22,821	23,599	919	605	1,684	1,990	2,617	1,143	1,309	623	467	698	36	285
West Virginia	10,466	7,765	10,207	18,170	19,574	1,678	2,025	3,948	3,945	3,823	2,301	2,329	744	552	465	303	1,486
North Carolina	11,391	6,352	14,103	20,883	26,710	1,284	1,453	2,127	2,814	3,058	1,896	1,777	846	329	197	242	551
South Carolina	4,905	3,123	5,589	9,910	13,616	1,549	1,668	3,740	6,969	6,480	2,253	1,900	452	316	429	336	618
Georgia	10,220	6,738	11,828	19,363	29,707	612	647	1,495	3,466	2,840	1,340	1,442	523	265	243	327	416
Florida	11,149	7,177	10,575	17,591	28,584	2,680	1,635	2,949	5,255	5,199	4,038	3,251	1,888	725	452	479	1,156
Total South Atlantic	93,004	72,051	97,418	160,416	177,482	1,932	1,140	2,718	3,869	1,558	2,471	2,419	2,377	1,545	3,080	2,388	987
						12,034	11,235	23,103	33,316	31,533	18,258	16,758	8,845	4,996	6,111	4,593	6,698
Kentucky	10,432	7,965	14,682	19,865	18,634	1,210	1,182	2,551	3,812	2,817	1,889	1,858	1,085	435	308	660	827
Tennessee	7,594	7,072	9,793	26,822	26,158	1,285	2,140	3,493	6,346	4,924	1,966	2,169	1,443	893	400	408	691
Alabama	6,244	4,565	9,785	16,914	24,528	1,012	1,931	3,482	5,982	4,242	2,367	1,619	879	415	351	386	1,862
Mississippi	3,268	1,793	3,327	5,182	7,393	253	478	1,197	1,924	1,381	638	670	567	167	139	13	(34)
Total East So Central	27,538	21,395	37,587	68,783	76,713	3,760	5,731	10,723	18,064	13,364	6,860	6,316	3,974	1,910	1,198	1,467	3,346
Arkansas	4,210	2,992	5,553	9,350	10,352	635	938	2,008	2,182	1,618	1,067	911	701	203	4	31	54
Louisiana	5,714	4,399	7,587	10,008	15,672	1,035	1,338	2,301	3,295	2,279	1,291	1,393	758	430	498	510	538
Oklahoma	10,146	8,093	12,634	17,900	17,890	1,336	2,073	2,885	4,014	2,920	1,487	1,466	580	181	175	465	508
Texas	29,426	20,369	37,293	53,078	66,324	4,178	7,086	8,165	15,729	9,538	6,331	5,101	3,795	1,640	1,708	1,545	1,508
Total West So Central	49,496	35,853	63,067	90,336	110,238	7,184	11,435	15,359	25,220	16,355	10,176	8,877	5,834	2,454	2,385	2,551	2,408
Montana	2,680	1,613	3,524	5,262	6,574	259	573	669	1,110	1,311	832	826	516	208	63	37	170
Idaho	2,847	1,517	2,311	4,457	7,336	608	595	858	1,204	1,342	1,147	716	421	176	65	26	178
Wyoming	1,882	677	1,408	2,337	2,529	168	229	357	391	407	344	318	141	62	33	19	60
Colorado	6,967	5,319	8,541	10,645	12,546	1,275	1,095	2,052	1,819	1,421	1,560	1,563	590	171	232	65	703
New Mexico	1,894	858	1,724	2,470	3,437	308	251	491	938	468	491	326	(57)	48	48	57	69
Arizona	3,622	1,490	2,418	3,857	5,903	600	433	881	1,570	677	756	410	181	125	104	57	109
Utah	4,446	2,941	4,444	6,005	7,618	462	560	963	1,525	1,345	1,486	523	345	176	40	89	104
Nevada	948	863	1,028	1,305	2,016	134	109	176	214	371	355	262	131	51	44	32	137
Total Mountain	25,286	15,278	25,398	36,338	47,959	3,814	3,845	6,447	8,771	7,342	6,971	4,944	2,268	1,017	629	381	1,530
Washington	8,138	5,312	11,807	18,438	23,315	1,985	2,281	4,326	2,266	3,511	2,262	1,967	1,770	1,120	454	671	702
Oregon	5,695	4,901	7,491	15,471	15,482	1,870	1,336	1,893	1,593	2,543	2,240	1,656	726	529	243	171	682
California	53,156	37,403	62,163	70,295	126,297	6,426	9,008	12,556	13,947	19,376	15,242	14,008	11,525	6,509	5,464	3,569	8,667
Total Pacific	66,989	47,616	81,461	104,204	165,094	10,281	12,625	18,775	17,806	25,430	19,744	17,631	14,021	8,158	6,161	4,411	10,051

Figures based on Report Issued by the National Electrical Manufacturers Association.
Figures by Month for 1935 are revised, and should be substituted for all previous Reports Issued.

Notes:

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Domestic Electric Service in 1935

New Figures Based on Questionnaire Reflect Changing Styles in Various Appliances—Except for Radios and Refrigerators, Use of Domestic Service Has Shown No Increase During the Past Five Years Although Rates Have Declined by Sixteen Per Cent

By William M. Carpenter

Economist, Edison Electric Institute

AS HAS been the custom for some time, an attempt has again been made to appraise the use of electricity by the principal domestic electric appliances during the past year, and the results of this analysis are shown in the table below and graphically by Chart 1.

This year Mr. C. E. Greenwood, Commercial Director, E. E. I., sent out a questionnaire to the various commercial executives requesting their opinion on the quantity of current taken by individual appliances, and an estimate of the percentage of these in regular use. It was commonly understood that the answer given must necessarily be a "pure estimate." Although the results of this survey showed a wide diversity of opinion, no doubt influenced by climate, sectional and living conditions, it has been possible nevertheless to establish a set of averages which are sufficiently conservative to fit the figures of electricity actually sold.

Each manufacturer of every kind of device naturally assumes that there are certain benefits to the utility, in addition to the advantages of service to the consumer, in the use of his products, particularly in energy use. Statistically, the situation must be analyzed from an unprejudiced viewpoint. There are only just so many kilowatt-hours consumed by domestic service and all calculations of

Chart 1.—Kilowatt-Hours Used by Various Appliances in Domestic Electric Service Since 1920

This Chart shows the cumulative effect of the increase in the number of consumers as well as the increase in the number of appliances. On the basis of the average customer, the trend is somewhat different and is shown by Chart 2.

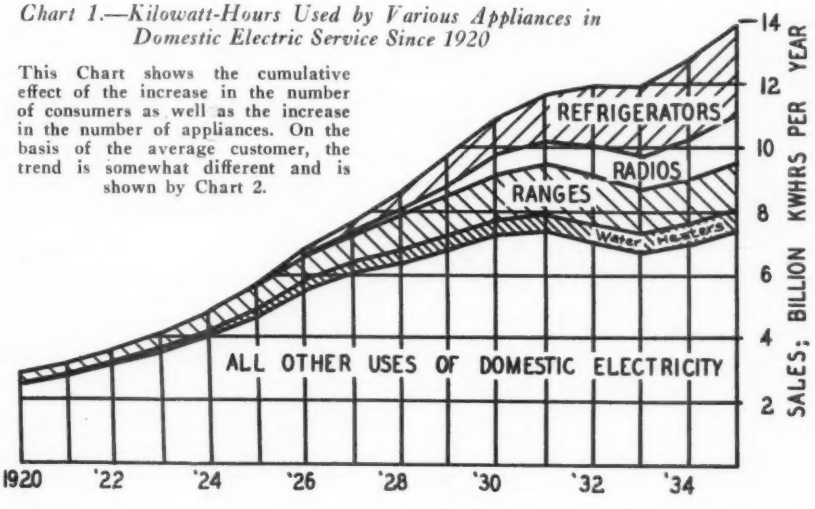


TABLE I—ENERGY USED BY DOMESTIC ELECTRIC COMPANIES

An Estimate for the Year 1935

Appliance	Number of Appliances in Homes on 12-31-34 (1)	on 12-31-35 (2)	Average (3)	% in Use (4)	Total in Active Service (5)	Normal Annual Use Kwhr (6)	Total Kwhr used in 1935 (7)
Flatirons	18,200,000	20,600,000	19,400,000	80	15,520,000	80	1,241,600,000
Vacuum Cleaners	9,650,000	10,050,000	9,850,000	85	8,372,500	24	200,940,000
Washing Machines	8,500,000	9,400,000	8,950,000	80	7,160,000	30	214,800,000
Toasters	8,000,000	8,850,000	8,425,000	50	4,212,500	30	126,375,000
Percolators	5,000,000	5,000,000	5,000,000	50	2,500,000	36	90,000,000
Space Heaters	3,400,000	3,550,000	3,475,000	40	1,390,000	50	69,500,000
Ironing Machines	839,000	950,000	895,000	80	716,000	125	89,500,000
Electric Clocks	7,800,000	8,800,000	8,300,000	94	7,800,000	15	117,000,000
Oil Burners	840,000	985,000	912,000	95	866,400	225	194,940,000
Ranges	1,050,000	1,200,000	1,135,000	85	965,000	1,500	1,447,500,000
Water Heaters (all types)	300,000	340,000	320,000	75	240,000	3,000	720,000,000
Small Appliances and Lights							5,102,523,000
Total; all above						463	9,614,678,000
Radio (socket only)	18,500,000	20,000,000	19,250,000	80	15,400,000	100	1,540,000,000
Refrigerators	5,820,000	7,250,000	6,535,000	90	5,882,000	480	2,823,360,000
Total; all uses of domestic service					20,779,100	673	13,978,038,000

Notes: Columns (1) and (2): Estimates largely from ratios shown in "Electrical Merchandising" and other trade papers; being based upon the summation of annual production of appliances less an estimated replacement demand. Column (3): The arithmetical average of columns (1) and (2). Column (4): An estimate allowing for duplicate and unused appliances, houses unoccupied, summer cottages, vacation periods, etc. If these factors are not used and the kilowatthours usually claimed for lighting are added, the grand total will be almost twice the actual sales of domestic electric service. Column (5): The product of columns (3) and (4). Column (6): An estimate covering the current taken by appliances in Column (5), namely; the kwhrs. consumed by an appliance in constant and regular use throughout the year.

appliance and lighting use cannot exceed this total.

Numerous Exaggerations of Electrical Use

Several factors contribute to an apparent exaggeration of the use of domestic service, and the part played by the individual appliances. Notable among these are:

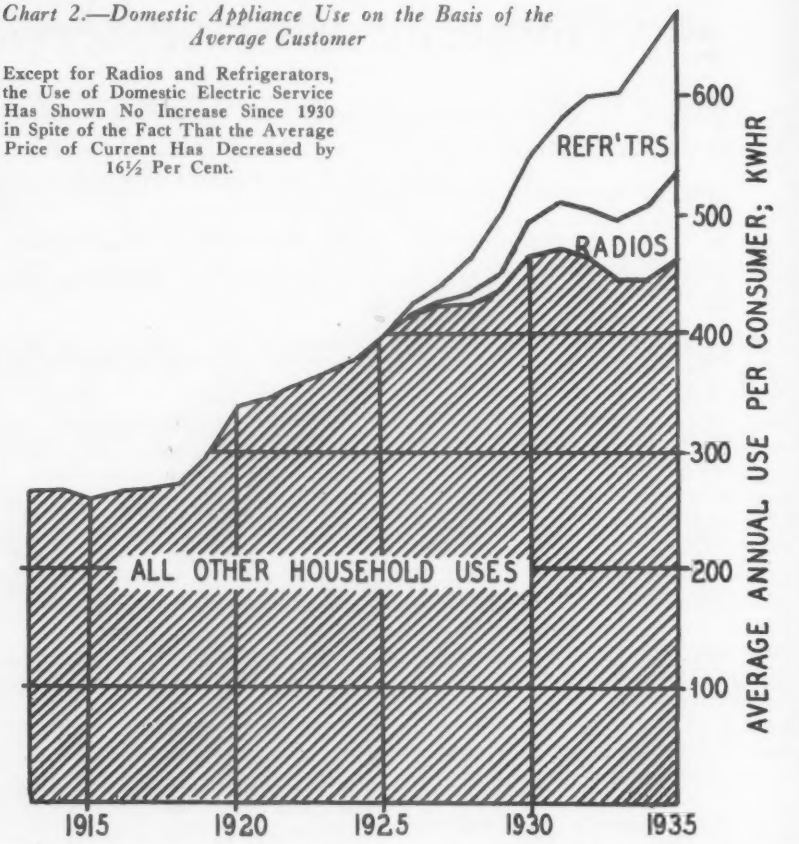
1. The assumption that electric appliances are practically immortal. Many of the figures commonly accepted as to total in service cannot be justified except by assuming that these appliances last at least 15 years without replacement. Things wear out—at least they do in my home—and it is not correct to arrive at figures for appliances in service by adding each year's sales to the previous year's total. Such computations lead to the assumption of a large increase in connected load and to a cruel delusion as to the size of the hypothetical market for electricity.
2. The assumption that most of the appliances are in steady and regular use. Too little weight is given to the existence of duplicate and unused equipment, to houses temporarily closed, to the very obvious effect of vacation periods and summer cottages, and to "trouble" of all kinds.
3. The assumption that because in a home a certain new appliance uses a considerable additional quantity of electricity, all of this originates with that particular device. This overlooks the effect of additional lighting and other appliances *that concur with* the use of the main item. This seems to be a very common mistake which goes far to support the high figures in numerous studies that have appeared from time to time on the effect of individual appliances.

Corrections to Previous Estimates

Some surprises were contained in the replies to Mr. Greenwood's questionnaire. Most striking was the amount of current taken by the humble flatiron, which in some cases was estimated as high as 180 kwhr per year. The average of 80 kwhr used in the table represents a considerable increase over previous figures and reflects the continued sale of large-wattage irons. The figure for washing machines was increased somewhat, but, at the same time, the replies indicated that vacuum cleaners, toasters, percolators and clocks had been somewhat overestimated. Due to the great increase in sales and somewhat larger units, the use of electricity by radios was considerably enlarged. On the other hand, the questionnaire indicated a marked decline in the current taken by ranges and refrigerators, apparently the result of the expanding sales of smaller and more efficient models.

Chart 2.—Domestic Appliance Use on the Basis of the Average Customer

Except for Radios and Refrigerators, the Use of Domestic Electric Service Has Shown No Increase Since 1930 in Spite of the Fact That the Average Price of Current Has Decreased by 16½ Per Cent.



What Do Promotional Rates Promote?

Taking the new figures for radios and refrigerators (which will probably be much criticized by the salesmen of both appliances as being unreasonably low) and making the necessary adjustments in previous years, Table II may be constructed on the use of electricity per domestic consumer in recent years.

It is evident from this table (and even more strikingly illustrated on the chart) that except for radios and refrigerators, the average domestic consumer uses no more electricity now than he did five years ago—in spite of a decline of 16½ per cent in the average price of current.

It is commonly assumed by almost everybody, both within and without the industry, that reduced rates automatically and of themselves bring an equal compensation in increased use. Yet here we have the unmistakable evidence that two appliances, in whose purchase the question of electric rates plays only a very minor part, have constituted the entire increase which has taken place since 1930 and that the net result of everything else has been no gain at all.

TABLE II—USE OF ELECTRICITY PER AVERAGE CONSUMER

	Kwhr Per Year				
	Total Use	Radio	Refrig-erators	All Other Uses	Average Price, ¢ Per Kwhr
1927	443	2	17	424	6.82
1928	465	8	30	427	6.63
1929	500	17	42	441	6.33
1930	548	29	59	460	6.03
1931	584	38	76	470	5.78
1932	601	44	95	462	5.58
1933	604	51	111	442	5.49
1934	631	61	125	445	5.30
1935	673	74	136	463	5.03

The Cost of Generating and Transmitting Wilson Dam Power

By H. S. Bennion
Edison Electric Institute

IN a speech in the House of Representatives on February 25, Congressman John E. Rankin of Mississippi, ostensibly to prove that power rates are unconscionably high, made the statement, "When this Administration came into power the Commonwealth and Southern was buying power at Muscle Shoals at 2 mills a kilowatthour. They were reselling it to the ultimate consumers less than half a mile away at 10 cents a kilowatthour, or a difference of 4,800 per cent." As further proof that the cost of generating power is really extremely small, Mr. Rankin quoted figures from the 1930 report of the Chief of Engineers of the U. S. Army, entitled "Tennessee River and Tributaries, North Carolina, Tennessee, Alabama and Kentucky," to the effect that power could be generated at Muscle Shoals for 1.352 mills per kilowatthour and delivered 350 miles at a total cost of 2.775 mills per kilowatthour.

In a letter published in the Congressional Record of March 9, 1928, President T. W. Martin of the Alabama Power Company fully explained the prices in the transaction involving the purchase and sale of Muscle Shoals power to show its entire reasonableness. Among other things, he showed that the price was not 2 mills but was a graduated price from 2 to 4 mills, the graduation being commensurate with the increment cost of generating an equal amount of power from several steam plants on the system of the Alabama Power Company. He pointed out that the purchase arrangement was revocable on thirty days' notice, which meant that the company must always be prepared with plants ready to replace Muscle Shoals power. Hence its low value to the company.

How meaningless such figures as used by Mr. Rankin may be without explanation of what they represent is well illustrated by the electric sales and revenue figures shown in the latest Annual Report of the TVA (page 29). According to that report, the TVA charged "other electric corporations" 7 cents per kilowatthour for energy taken immediately at the power house, while it charged only .578 cents per kilowatthour for power delivered to the Alcorn County Power Association, fifty miles away, and it delivered power to its own fertilizer plant at Muscle Shoals for .086 cents per kilowatthour. Without explanation these figures do not make sense. Of course, the reasonableness of the 7 cent figure can be explained if the attendant factors and circumstances are stated.

The figures quoted by Mr. Rankin are not from the 1930 report itself but from a section of one of its appendices, Appendix G—"Present and Future Demand for Electric Power from the Tennessee River Basin," by Joseph Wright, Associate Engineer. They have been taken out of the context of the appendix and used without explanation, to give a meaning quite different from what the author meant to give. Mr. Wright's calculated figures assumed a large composite steam and hydro system in which the generators at Wilson Dam and the transmission lines leading therefrom would operate at 100 per cent of capacity, the power to be sold to companies furnishing their own steam power to carry the peaks and supply the necessary reserves for their systems. This is clearly evident from his Table VII. In the following table the first, second and fourth columns are taken from Mr. Wrights' Table VII, page 530. The third column is taken from another table on the same page of his report.

Distance Transmitted	*Cost of Hydro Power per kw-yr Delivered*	*Mills per kwh*	*Composite Power in the System—Prime Power in the System Cost per kwh (mills)*
0 (at switchboard)	$11.83	1.352	3.161
100 miles	17.43	1.993	3.618
200 miles	20.22	2.310	3.825
250 miles	21.60	2.467	3.940
300 miles	22.98	2.625	4.055
350 miles	24.30	2.775	4.165

Mr. Rankin took only the figures in column three. It is obvious that Mr. Wright obtained these figures by dividing those in column two by 8760 hours; that is, he assumed each kilowatt of capacity would operate 100 per cent of the year, which of course it would not.

The cost figure per kilowatt-year at Wilson Dam appears very low by comparison with the cost of power delivered to Niagara Falls, Ontario, adjacent to the generation stations, as reported by the Ontario Hydro Commission in its 1934 Annual Report (page 430), which shows $21.49 per horsepower-year or $28.65 per kilowatt-year, or about two and a half times Mr. Wright's figure of $11.83. Without challenging the soundness, however, of this $11.83 figure, as a practical matter no system of power plants selling electricity for general public use has ever come anywhere near 100 per cent operation. Such a load factor would fail so seriously to conform with the load factor of the systems supplying power for general public use in the surrounding areas that this supply of power would have low value in the power market, because of the large amount of peak load and reserve capacity that the companies buying this kind of power would have to have. Mr. Wright evidently appreciated this fact in part, as evidenced by his comments and by the fourth column in the preceding table taken from his Table VII, which Mr. Rankin omitted from his abstract.

In 1931, Colonel M. C. Tyler found that the annual sales of electricity by the seven major utility companies in the Tennessee Valley area were only 26½ per cent of the capacity of their power houses. He stated that the figure of 2324 kilowatthours per kilowatt of installed generating capacity (26½ per cent of full operation at the switchboard) "is one which may be used to determine the approximate practicable annual output of the Government's plants if made to serve as the generating stations of an independent system, hav-

ing the same system load factor as that of the public utilities." (See page 19, report of Colonel M. C. Tyler, Muscle Shoals Commission, Government Printing Office, Washington, 1933.)

In 1935, the United States Geological Survey showed an output for the three states of Tennessee, Alabama and Georgia of 2700 kilowatthours per kilowatt of installed capacity, which is equivalent to operation at about 31 per cent of capacity.

The Hydro Electric Power Commission of Ontario, with a constant volume of water at its disposal at Niagara Falls, averaged only 3127 kilowatthours per kilowatt of capacity for all of its plants in 1934 (Annual Report, page 8), equivalent to operation at 35 per cent of capacity.

Much of the publicity given to the cost of Boulder Dam power in its earlier stages was of this same kind which expects all machinery to run all the time. Further consideration has brought some disillusionment, as may be seen from the following quotation from the 1934 report of Mr. B. F. DeLanty, General Manager of the Pasadena Light and Power Department (page 6):

"The base price of current generated at Boulder Dam will be 1.63 mills per kilowatthour. This power will be taken on 60 per cent load factor. When the current is delivered at Pasadena (230 miles away) the average cost will be 3.77 mills for the current delivered during the life of the contract."

This is power at 60 per cent load factor which will be supplemented by other generating capacity for reserves and for peak load requirements, to add to the final cost of Pasadena's bulk power supply. The transmission lines from Boulder Dam to Los Angeles are in the light loading area so that they do not have to be designed for ice storms, they traverse a treeless region and, in large part at least, are in a region of few lightning storms, so that their first cost, maintenance and operation should be lower than for lines in Tennessee.

It costs the Federal Government as much if not more to build power dams than it costs private industry to build them. The building of Norris Dam, for instance, at a cost of $36,400,000 has not shown private enterprise how to build dams cheaper nor proven that the reported costs of dams which have been built by private enterprise are improperly high. If anything, it has shown the reverse. Therefore, to produce a low cost estimate of power from a government dam, an estimator is tempted to assume extraordinarily high utilization of the generating plant. But where the capacity of a generating plant is so large as to dominate the power supply of a region, the estimator must face realistically the load factor of the existing markets, as Colonel Tyler did in the report above referred to. This has evidently also been done by the Advisory Committee on Power of the Oregon State Planning Board in studying the market for power from Bonneville Dam. The reported costs of generating and transmitting power of the Ontario Hydro Commission, which has been operating many years, necessarily deals with actual power market conditions rather than purely theoretical ones, and its cost statements are very much higher than the figures Mr. Rankin has quoted.

YARDSTICK AND BIRCH ROD

Cartoon from Louisville *Courier-Journal*, Feb. 21, 1936

In a report dated January 6, 1936, the Oregon State Planning Board's Advisory Committee on Power, of which Mr. J. C. Stevens was Chairman, as summarized in the February 27 issue of the *Engineering News - Record*, shows as the cost of power delivered from Bonneville Dam to more distant communities in Oregon the following amounts:

	Cost of Delivered Energy per Kilowatthour in mills		
	Generation	*Transmission*	*Total*
Klamath Falls (230 miles air line)	2.66	4.39	7.03
Vale (240 miles air line)	3.46	10.29	13.75
Burns (190 miles air line)	4.67	37.81	42.48

The 1934 report (page 428) of the Ontario Hydro Commission shows for the town of Leamington, population 5000, transmission distance from Niagara 263 miles, a cost for delivered power of $38.06 per horsepower-year, or $50.75 per kilowatt-year. The load factor of separate communities is not stated in the report, but assuming that the load factor at Leamington was 30 per cent,

a little below the Hydro system average, this amount is equivalent to a delivered cost of 19.3 mills per kilowatthour. If this load factor was 35 per cent, the average for the entire system, this cost is the equivalent of 16.5 mills per kilowatthour.

The highest cost figure shown in the 1934 report is for the little town of Holstein, population 300, situated about 125 miles from Niagara. It shows $124.71 per horsepower-year, or $166.28 per kilowatt-year—the equivalent of 63.3 mills per kilowatthour for a 30 per cent load factor.

The sharp contrast between the estimated cost of 2.467 mills per kilowatthour for Wilson Dam delivered at a point 250 miles distant, as quoted by Mr. Rankin from Mr. Wright's table, and the foregoing kilowatthour costs is very apparent. If Mr. Rankin had quoted also Mr. Wright's assumptions, his estimated costs, although wide open to question as to reasonableness, are fairly understandable and not entirely incompatible with the Oregon figures and Ontario figures shown above. But to seize upon his lowest price table without his statement of assumptions, as Mr. Rankin has done, and to put these prices forward as the true cost of generating and transmitting electricity is not only misleading but is very deceptive.

Of course, if the TVA in its bookkeeping continues to allocate for navigation, flood control, national defense, etc., a large part of the construction cost and a substantial part of the operating expenses of Wilson Dam and its other power dams on the Tennessee River, it can show on paper extraordinarily low power costs. So also could private power companies if their bookkeeping were to set up the same theoretical deductions. In a speech before the Rotary Club of Birmingham, Alabama, on November 7, 1934, Mr. Wendell L. Willkie, President of The Commonwealth and Southern Corporation, pointed out that the TVA was proposing to write down the Muscle Shoals power plants on its books from $60,000,000 to $20,000,000, a write-down of 66 2/3 per cent, and proceeded to show that if the Alabama Power Company were given the funds to make a similar write-down of its investment and if it enjoyed the same tax exemption advantages as the TVA, it could put into effect electric rates actually lower than the TVA rates. The accounts of the Alabama Power Company are public records and with the use of a little elementary arithmetic anyone can prove this statement.

In the opening paragraph of his speech of February 25, Mr. Rankin made reference to Mr. Willkie's statement concerning the effect of TVA subsidies if applied to Alabama Power Company rates and inferred that it had been "debunked." As a matter of fact, no figures have been produced by anyone to disprove or debunk the statement. Instead, the idea that the TVA was to establish a full 36-inch yardstick appears to have been debunked. The Louisville *Courier-Journal*, in a recent cartoon showing the yardstick used as a birchrod on the back of the mythical Power Trust, pictured a stick only 12 inches long, indicating that the public subconsciously has already concluded that the TVA has lopped off two-thirds of its yardstick.

Joint Electrical Industry Promotion Committee is Organized

UPON the invitation of Mr. E. N. Peak, President of National Electrical Contractors Association, representatives of the four branches of the industry met at a dinner at Hotel Commodore on December 12, 1935, to discuss the forward progress of electrification. Out of that meeting came a Resolution which would provide for a continuing Committee of three representatives from each of the major associations to carry out the purposes of the conference.

The Committee of twelve officially appointed representatives are as follows:

National Electrical Manufacturers Association

F. C. Jones, president, NEMA (president, Okonite Co., New York City).

S. L. Nicholson, ass't to vice-president, Westinghouse Electric & Mfg. Co., New York City.

C. E. Swartzbaugh, president, Swartzbaugh Mfg. Co., Toledo, Ohio.

National Electrical Wholesalers Association

F. R. Eiseman, chairman, NEWA (secretary-treasurer, Revere Electric Co., Chicago, Ill.).

B. W. Clark, vice-president, Westinghouse Electric Supply Corp, New York City.

G. E. Cullinan, vice-president, Graybar Electric Co., New York City.

Edison Electric Institute

B. F. Weadock, vice-president and managing director, Edison Electric Institute, N. Y. C.

E. W. Lloyd, vice-president, Commonwealth Edison Co., Chicago, Ill.

H. P. J. Steinmetz, Public Service Electric & Gas Co., Newark, N. J.

National Electrical Contractors Association

E. N. Peak, president, NECA (Marshall Electric Co., Inc., Marshalltown, Ia.).

Robert W. McChesney, Harry Alexander, Inc. Washington, D. C.

R. M. Walker, chairman, Distribution Committee, NECA (Walker Electrical Co., Atlanta, Ga.).

The organization meeting of this joint committee was called by President E. N. Peak on January 7, 1936. Mr. Peak was elected permanent Chairman and C. E. Greenwood, Commercial Director, Edison Electric Institute, was elected Secretary. The title of the Committee determined upon is an expression of its general purpose, namely, Electrical Industry Promotion Committee.

"Our idea as Contractors, in asking the formation of this Committee, is not to supplant any existing agencies or committees or any of the activities of any of the branches of the industry, but to support and promote the activities of each by a coordination of industry effort in the increase of more profitable business for all," said Mr. Peak. "There is no thought in the minds of the Electrical Contractor to set up any new organization for the handling of the activities of this committee but to coordinate the efforts of the several branches of the industry and use the existing facilities of each to increase present programs and be creative of new ones."

Business Development Programs now in progress by joint sponsors of two or more electrical associations were discussed, and there was unanimity of opinion on the advantages to be gained for all branches of the industry through coordination of electrical promotion, and the adoption of cooperative measures. Controversial subjects were brushed aside for the common interest of all in aggressive industry promotion.

Out of the constructive discussion of this first meeting of the Electrical Industry Promotion Committee there were crystallized plans for coordination and forwarding six commercial programs now active, namely: Better Light-Better Sight, Kitchen Modernization, Electrical Housewares, Electric Water Systems, Electric Welding, Highway Lighting.

The important subjects of House Wiring, Air Conditioning, Unified Financing Plans, and Industrial and Commercial Lighting were agreed upon for further discussion and for industry planning when the Committee convenes in Chicago in March.

Program—Third Annual National Sales Conference Edison Electric Institute

March 25-26, 1936

Edgewater Beach Hotel, Chicago, Ill.

Presiding: H. P. J. STEINMETZ, General Sales Manager, Public Service Electric & Gas Co. Chairman, Sales Committee, E.E.I.

Wednesday Morning Session

10.00 Opening Address
H. P. J. STEINMETZ, chairman

10.10 The Sales Challenge of Today
E. W. LLOYD, vice-president, Commonwealth Edison Company
Symposium on National Cooperative Programs

10.30 (1) The Kitchen Modernizing Program Is In Motion
G. E. WHITWELL, vice-president, Philadelphia Electric Company
Chairman of Bureau

10.45 (2) New Ventures in Better Light-Better Sight
M. E. SKINNER, assistant vice-president, Niagara Hudson Power Corporation
Chairman of Bureau

11.00 (3) Electrical Housewares Promotion Expands
H. P. J. STEINMETZ, chairman, Sales Committee

11.15 (4) The Third Year of Running Water Program
P. H. POWERS, vice-president, West Penn Power Company
Chairman of Council

11.30 The Contractor and the Utility
EARL N. PEAK, president, National Electrical Contractors Assn.

12.00 General Discussion

12.30 Formal Luncheon
Speakers: BERNARD F. WEADOCK, vice-president and managing director, Edison Electric Institute
Subject: Some Legal and Political Aspects of the Utility Industry
W. W. FREEMAN, vice-president, Columbia Gas & Electric Corp.
Subject: Observations on the Government's Rural Electrification Program

Wednesday Afternoon Session

2.45 Standardized Light Prescribing Technique—Its Possibilities
EARL L. CANFIELD, president, Sight Light Corporation

3.00 Our Air Conditioning Market
C. E. MICHEL, vice-president
Union Electric Light and Power Company

3.20 Sales Approach to the Air Conditioning Market
L. R. BOULWARE, vice-president
Carrier Engineering Corporation

3.50 The Status of Industrial Power Development
H. C. WEBB, JR., commercial manager
Virginia Electric & Power Company

4.15 Showing of New Sound-Slide Film Better Light-Better Sight

4.25 General Discussion

Thursday Morning Session

10.00 The Electric Range Market, Today and Tomorrow
REESE MILLS, Westinghouse Electric & Manufacturing Company
Chairman, Range Section of NEMA

10.25 Intensified Selling in the Low Income Groups
C. A. COLLIER, vice-president, Georgia Power Company

10.50 New Approaches to the Sale of Electrical Equipment
C. E. WILSON, vice-president, General Electric Company

11.15 Business Development in California
R. C. MCFADDEN, new business manager
Southern California Edison Company, Ltd.

11.45 Commercial Progress Viewed from the Field
DR. G. W. ALLISON, Edison Electric Institute

12.15 Adjournment of the Conference

1.15 Luncheon Meeting—Sales Committee
H. P. J. STEINMETZ, chairman

BUNNY-DOGGLING BRINGS GRIEF

"The Goose Hangs High," comments Ray Watts in *The News Meter* of the San Diego Consolidated Gas & Electric Company "but," he continues, "this hawk, Pauma Valley marauder, lost his life by a hare when he contacted our 11-Kv. line en route home with his prey. Note strand of wire protruding from talon."

In philosophic vein, Mr. Watts writes:

"Here's all that remains of 'Red' the hawk. Red lived high on the slopes of Palomar Mountain. Ever since he was elected to manhood he has roamed the valleys of the country at will, filling his young red gullet with the choicest morsel of the rich fields. It was environment that led him to the habit of bunny-doggling, in which he would swoop on a tender young rabbit, and before the victim realized what was happening he was off the ground and on the way to the eternal land of alfalfa and tender grape shoots.

"Red's mother had cautioned him about this game of bunny-doggling, especially as it wasn't safe near the ground, what with all those power company lines and other hazards. But Red was smart and the game was fun, so one day in Pauma Valley he spied a cottontail ankling along through a vineyard and decided that here was a swell chance to doggle. Doggle he did, and was peacefully removing the north end of his kill when he was disturbed. Greedily he grabbed his lunch with one taloned foot and started off for a more quiet place. Here he made his first and last mistake. He turned as though to gloat over the job he had done, lost altitude, and landed smack dab into one of Percy Fisher's livest 11-Kv. transformer switches.

"The moral of this story is: If you're going to bunny-doggle, keep both eyes and ears open, keep your mind on the job, and don't look back with too much satisfaction on what you've done. You might be near a hot spot.

"Glenn Womack recovered this specimen from the 11-Kv. station in Pauma Valley while trouble shooting on a 'no juice' complaint."

Public Relations in Canada

By R. B. Baxter

President, Canadian Electrical Association

From An Address Before the CEA Convention

LIKE most of my associates in the power business I find that I have not given as much time or attention to public relations as that important question deserves and to add to the confusion some of my friends who are students of public psychology argue, and with considerable force, that the proper plan to follow in building and holding public relations is to give good service and keep quiet about it, while others, with equal force, claim that we should be continuously keeping the public informed about our business through the press, the radio and by whatever other means we have available.

From our experience during the past few years there is one thing that I do know, and that is that our opponents are not keeping quiet; and with a continuous stream of propaganda going out from various quarters they have been at least partially successful in destroying the good public relations that should exist between the power companies and the people they are serving. Who are behind this propaganda? In almost every case they are people who know little or nothing about our business, but who for reasons best known to themselves find pleasure and perhaps profit in talking about the so-called power barons and fabulous profits made by those who they claim monopolize the business. Whether true or untrue, it makes no difference to them, nor does it make any difference whether or not they know anything about our business. There is, however, the danger that they will destroy our public relations or try to use for their own purposes works and development that represent years of pioneering, the risking of millions of capital and the combined thought and energy of thousands of men who have been actively engaged in building up the power business in Canada.

There is also the propaganda spread by the advocates of public ownership, who generally use rate comparisons without regard to class or density of population in the territory under discussion and without taking into consideration the fact that in most cases the publicly owned utility pays no taxes while the privately owned power companies pay upward of seven millions of dollars in taxes annually to municipal, provincial and Federal governments. They also fail to point out or do not know that many of the Governments contribute directly and indirectly to the cost of constructing and operating these public owned utilities through free services from legal, financial and administrative departments, most of which expense is charged to and increases the cost of government. If fair comparisons are to be made, then all of these costs must be included, so that the user and taxpayer will know what he is paying for the publicly owned service. Now, added to all this, comes repudiation of contracts by the Hydro-Electric Power Commission of Ontario. Is public ownership worth that price?

The repudiation of these contracts is now being used in some quarters to damage our public relations. The argument seems to be that the private power companies took advantage of the Hydro-Electric Power Commission when the contracts were made. Such an argument when carefully analyzed is obviously ridiculous. The Hydro-Electric Power Commission of Ontario has the largest single organization of any power producer in the Dominion of Canada and consequently has a complete organization of engineers and commercial experts who are quite capable of making the necessary studies to determine the power requirements of that system. A careful study of future power requirements must have been made by that organization before these contracts were entered into. The facts really are that the contracts were made between the years 1926 and 1931, following which there was a complete reversal of conditions and the Hydro along with all other business in the country experienced a setback due to the world depression. They did not have the expected increase in load and chose to repudiate contracts as a way out of that difficulty. I do not propose at this meeting to discuss the merits of the action taken by the Hydro-Electric Power Commission regarding these contracts. I do, however, feel quite at liberty to discuss this matter insofar as it affects our public relations and I feel that we cannot stand by and have criticism of that kind used against private power companies in general.

At this point I think it is well to take a look at our business and see whether or not we have earned the right to have public confidence and goodwill. I believe that we have, and that our business has made and is making a very large contribution to the development of this country and to the welfare of the people. This organization represents fifty power companies, supplying light and power to thousands of industries and commercial establishments and hundreds of thousands of homes from the Pacific Coast in the West to the Atlantic Coast in the East, with $900,000,000 of capital.

Those sections of the country which elect to operate under the banner of public ownership have another $600,000,000 invested in the business. The largest of this group is the Hydro-Electric Power Commission of Ontario, but there are several other provincially owned systems and many municipalities engaged in the business of supplying light and power throughout the Dominion. In the two groups we have approximately $1,500,000,000 of money invested in the business throughout Canada.

For the purpose of illustration, I am going to describe the development and results of a typical power company. I must use one with which I am entirely familiar and that happens to be a company located in the Province of Alberta. Prior to the development of power by this company in the Province and apart from the cities of Calgary, Edmonton, Lethbridge and Medicine Hat, power was being supplied by small individual steam or Diesel plants in approximately fifty of the cities and towns in the Province. Many of the smaller points had

partial service only and in the villages and hamlets there was no electric service. Forty of the municipalities owned their own steam or Diesel plants and with the exception of the four large cities, rates varied from 12 to 20c per kwhr with little or no prospect of any improvement. Mr. Gaherty and his group after carefully studying the problem for several years launched out on a widespread development which included the building of an additional hydroelectric plant on the Bow River, the improving of water storage, the building of 1850 miles of transmission lines, the buying of fifty municipal and private plants and distributing systems and ending up with a system distributing power throughout most of the settled sections of the Province of Alberta from three hydroelectric plants on the Bow River and providing service to 150 cities, towns and villages at a cost of upward of $20,000,000. Rates were more than cut in half throughout the whole territory. Continuous and reliable service was provided and a cheap supply of reliable power was made available for industry in almost any part of the Province. The story of that company's development is typical and can be told about almost any power development in the Dominion and I believe it illustrates that power development is the result of careful planning which not only requires initiative but also the combining and risking of large sums of capital and labor and when carried through to a successful conclusion results in considerable benefit to the citizens as a whole. During the past five years we have had to carry a considerable amount of unused plant and equipment and, like other power companies, expenses have been curtailed and the company has carried on giving service and meeting its obligations.

Canada is close to the top of the list in power development per capita in the world. Our rates are comparable with any and lower than most countries and our service is amongst the best. I believe that power companies have been willing and anxious to reduce costs and bring about a greater use of power, which is the greatest factor of all in bringing about lower costs to the consumer. I believe that a well-informed public will continue to support the power companies in the development of this great industry which has served them well in the past and will continue to serve them well in the future.

SALES—ELECTRIC REFRIGERATORS

(Household Models Only)

MONTH OF JANUARY, 1936-1935

	Month of January, 1936	Month of January, 1935	Month of December, 1935
Total United States	*119,764*	*97,425*	*75,904*
Maine	245	376	138
New Hampshire	241	221	131
Vermont	119	92	88
Massachusetts	4,112	3,431	3,293
Rhode Island	434	399	200
Connecticut	1,210	788	630
Total New England	6,361	5,307	4,480
New York	11,056	8,702	10,857
New Jersey	5,100	3,222	3,996
Pennsylvania	12,040	5,212	7,958
Total Middle Atlantic	28,196	17,136	22,811
Ohio	8,009	8,611	4,673
Indiana	4,352	2,962	1,381
Illinois	8,169	7,216	6,917
Michigan	5,391	4,459	5,199
Wisconsin	2,281	1,661	1,205
Total East North Central	28,202	24,909	19,375
Minnesota	1,640	1,480	1,457
Iowa	1,889	1,859	344
Missouri	3,870	5,354	1,912
North Dakota	187	175	137
South Dakota	337	497	143
Nebraska	1,364	2,193	715
Kansas	1,948	1,442	497
Total West North Central	11,235	13,000	5,205
Delaware	271	144	224
Maryland	1,129	1,236	975
District of Columbia	1,170	919	285
Virginia	1,627	1,678	1,486
West Virginia	1,081	1,284	551
North Carolina	1,399	1,549	618
South Carolina	743	612	416
Georgia	1,190	2,680	1,156
Florida	1,786	1,932	987
Total South Atlantic	10,396	12,034	6,698
Kentucky	1,685	1,210	827
Tennessee	1,800	1,285	691
Alabama	1,184	1,012	1,862
Mississippi	619	253	(34)
Total East South Central	5,288	3,760	3,346
Arkansas	1,062	635	54
Louisiana	1,510	1,035	538
Oklahoma	2,305	1,336	308
Texas	5,676	4,178	1,508
Total West South Central	10,553	7,184	2,408
Montana	487	259	170
Idaho	567	608	178
Wyoming	142	168	60
Colorado	1,005	1,275	703
New Mexico	251	308	69
Arizona	491	600	109
Utah	435	462	104
Nevada	188	134	137
Total Mountain	3,566	3,814	1,530
Washington	3,722	1,985	702
Oregon	2,435	1,870	682
California	9,810	6,426	8,667
Total Pacific	15,967	10,281	10,051

Figures based on Report issued by the National Electrical Manufacturers Association E.E.I. 3-4-36.

Farm Electric Service in 1935

AN increase of 44,840 farm electric customers during the year 1935, bringing the total to 788,795, or 12½ per cent of all classes of farms in the United States, is reported by the Edison Electric Institute in its annual publication of farm statistics. This gain of nearly 45,000 electrified farms compares with a figure of 30,400 for the previous year and with the high record of 113,000 made in 1928. The largest increases occurred in Michigan, with an addition of 8,724 farm customers, and in Ohio with 4,865.

On the basis of all farms reported by the U. S. Bureau of the Census, the State of New Hampshire had the highest percentage of electrification with 68 per cent of farms connected. Connecticut, New Jersey, Utah and California each had 60 per cent; New England as a whole, 48 per cent; and the Pacific Coast, 54 per cent.

Viewed as a practical matter, however, the performance is really much better than this. About 400,000 of the farms enumerated by the Census actually have no houses at all on them and of the total of 6,288,000 farms in the United States, 2,516,000, or 40 per cent, have dwellings valued at less than $500. Since it costs $350 for wiring and for the more common appliances in the home, few of these farms are prospective electric customers. This is emphasized by the fact that some 160,000 farms reached by power lines do not take electricity.

The number of electrified farms is 21 per cent of the farms reported in 1930 with dwellings valued at $500 or more. This ratio for the Pacific Coast is 73 per cent; for New England, 54 per cent; for the Middle Atlantic States, 38 per cent; and for the Rocky Mountain region, 37 per cent. It is lowest where farm homes are widely separated and the percentage of small tenant farmers is greatest. In the Southwest it is only 6 per cent and in the West North Central States, 10 per cent. The highest ratios of electrified farms on this basis of classification are in Utah and Arizona with 94 per cent and 88 per cent respectively, and the lowest are in North and South Dakota with 3.2 and 4.5 per cent respectively.

The farms east of the 100th meridian, for which figures are not obscured by irrigation pumping, showed an increase

NUMBER AND PERCENTAGE OF FARMS SERVED—1923—DEC. 31, 1935

	Number of Farms April, 1930	Farms Served on December 31, 1923 Number	%	Farms Served on December 31, 1935 Number	%	Percentage* Based on Farms with Dwellings of $500 or over
Total United States	6,288,648	177,561	2.8	788,795	12.5	20.9
Maine	39,006	5,676	11.3	14,349	36.8	44.1
New Hampshire	14,906	2,396	11.4	10,186	68.3	76.6
Vermont	24,898	2,384	8.6	8,116	32.6	36.1
Massachusetts	24,898	2,440	7.3	14,690	57.4	62.8
Rhode Island	3,322	400	10.2	1,975	59.5	64.8
Connecticut	17,195	2,626	11.2	10,488	61.0	65.1
Total New England	124,925	15,922	10.1	59,804	47.9	53.9
New York	159,806	16,000	8.5	61,506	38.5	41.9
New Jersey	25,378	1,000	3.4	15,356	60.5	65.4
Pennsylvania	172,419	12,918	6.5	47,584	27.6	30.6
Total Middle Atlantic	357,603	29,918	7.1	124,446	34.8	38.2
Ohio	219,296	16,803	6.6	52,913	24.1	28.0
Indiana	181,570	3,228	1.6	25,390	14.0	16.9
Illinois	214,497	2,201	1.0	29,485	13.7	15.9
Michigan	169,372	2,996	1.6	50,876	30.0	34.6
Wisconsin	181,767	7,429	3.9	40,413	22.2	24.8
Total East North Central	966,502	32,657	3.1	199,077	20.6	23.9
Minnesota	185,255	3,339	1.8	14,190	7.7	8.8
Iowa	214,928	11,237	5.3	32,916	15.3	16.5
Missouri	255,940	2,913	1.1	18,643	7.3	10.3
North Dakota	77,975	114	0.2	1,988	2.5	3.2
South Dakota	83,157	483	0.6	2,928	3.5	4.5
Nebraska	129,458	790	0.6	9,946	7.7	8.8
Kansas	166,042	900	0.5	13,997	8.4	10.6
Total West North Central	1,112,755	19,776	1.8	94,608	8.5	10.4
Delaware	9,707	105	1.0	1,865	19.2	22.0
Maryland & Dist. of Col.	43,307	1,000	2.0	8,003	18.5	21.9
Virginia	170,610	2,100	1.1	16,088	9.4	15.1
West Virginia	82,641	215	0.2	5,005	6.1	9.9
North Carolina	279,708	2,100	0.7	11,558	4.1	8.6
South Carolina	157,931	900	0.5	4,763	3.0	9.6
Georgia	255,598	137	0.1	7,128	2.8	8.6
Florida	58,966	353	0.6	5,686	9.6	24.1
Total South Atlantic	1,058,468	6,910	0.6	60,096	5.7	12.2
Kentucky	246,499	3,411	1.3	8,991	3.6	9.0
Tennessee	245,657	1,350	0.5	10,922	4.4	11.0
Alabama	257,395	1,000	0.4	11,442	4.4	16.8
Mississippi	312,663	500	0.2	3,130	1.0	4.7
Total East South Central	1,062,214	6,261	0.6	34,485	3.2	10.3
Arkansas	242,334	500	0.2	3,847	1.6	6.3
Louisiana	161,445	275	0.2	3,296	2.0	8.0
Oklahoma	203,866	1,600	0.8	5,854	2.9	6.7
Texas	495,489	2,100	0.5	12,039	2.4	5.0
Total West South Central	1,103,134	4,475	0.4	25,036	2.3	5.8
Montana	47,495	550	1.2	2,899	6.1	11.0
Idaho	41,674	5,050	12.5	14,872	35.7	53.9
Wyoming	16,011	280	1.8	547	3.4	6.1
Colorado	59,956	1,118	1.9	7,236	12.1	19.5
New Mexico	31,404	250	0.8	1,400	4.5	14.3
Arizona	14,173	225	2.1	5,921	41.8	88.0
Utah	27,159	3,330	12.9	16,554	61.0	94.3
Nevada	3,442	125	3.2	976	28.4	41.1
Total Mountain	241,314	10,928	4.6	50,405	20.9	36.9
Washington	70,904	13,400	18.3	40,454	57.1	77.5
Oregon	55,153	5,250	9.4	19,284	35.0	47.5
California	135,676	32,064	23.5	81,100	59.8	80.2
Total Pacific	261,733	50,714	20.3	140,838	53.8	72.6

*Basis data from 1930 Census of Agriculture.

E.E.I. March 3, 1936

in use of electricity per average farm from 814 kilowatthours per year in 1934 to 872 in 1935. The average revenue per kilowatthour fell from 6.12 to 5.57 cents. This compares with an average use of all household consumers, both urban and rural, of 673 kilowatthours per year per customer in 1935 and an average revenue of 5.03 cents per kilowatthour.

Estimates received from power companies indicate that the mileage of rural lines to be built in 1936 will be double the mileage for 1935, but because of leaner territory the increase in number of farms served will be only 50 per cent greater than in 1936.—W. M. C.

FARM SERVICE—1933, 1934, AND 1935

(Number of Farms Served, Killowatt-hours Sold and Revenues Received)
Reported Figures Extended to Include Entire Electric Light and Power Industry

	Year 1935	Year 1934	Year 1933
States Approximately East of 100° Meridian			
Farms Served	572,516*	534,203*	507,522*
Kilowatt-hours Sold	481,688,000	425,432,000	388,549,000
Revenue	$26,832,200	$26,025,000	$25,041,800
Kilowatt-hours per Farm	872	814	770
Average Annual Bill	$48.57	$49.82	$49.65
Revenue per Kilowatt-hour	5.57¢	6.12¢	6.45¢
States Approximately West of 100° Meridian			
Farms Served	216,279*	209,751*	206,036*
Kilowatt-hours Sold	1,210,710,000	1,432,022,000	1,243,994,000
Revenue	$21,572,400	$23,157,600	$21,460,100
Kilowatt-hours per Farm	5,673	6,833	6,038
Average Annual Bill	$100.98	$110.49	$104.16
Revenue per Kilowatt-hour	1.78¢	1.62¢	1.73¢

*As of December 31st.

That Chanute Plant

"THE DEVIL GETS HIS DUE"

An editorial from the Emporia, Kans., *Gazette*.

ABOUT a year ago, when the Kansas Electric Power Company was promising lower gas rates and a plentiful supply of natural gas for Emporia if the town would grant the power company a franchise, many persons who opposed the franchise held out for a municipal gas plant. At the same time, many who favored granting the franchise ridiculed the idea of a city-managed gas plant and cited Emporia's water shortage as an example of municipal management.

But others who favored city ownership pointed to Chanute's gas situation as an ideal setup. In fact, for years Chanute's plan of municipal ownership of utilities has been held up as a shining example and the Kansas press has from time to time advertised the Chanute utilities as money makers and tax reducers as well as good providers.

But this month has been another story. Recently the Chanute *Tribune* has been shrieking complaints because of a gas shortage during the coldest weather in many years. "Gas Supply Shrinks, Homes Cold, but Relief Expected Late Today," read a three-column headline over the *Tribune's* main story. And over a two-column page 1 editorial, the *Tribune* pleaded, "Let's Get the Gas."

"It is intolerable that such conditions should exist," wrote the Chanute editor, in an attitude that Emporians never before had seen taken toward a Chanute municipal utility. "Much suffering due to lack of adequate gas must have existed in Chanute homes this morning. * * * Citizens who are dependent upon gas for any purpose are entitled to adequate service in any kind of weather. * * * The city of Chanute as a municipality is engaged in the business of gas distribution to its customers. In that capacity its position is one of a utility which might have a franchise or contract to furnish to the homes of Chanute gas or any other utility, just as exists in other towns. * * * There should be no excuse, barring unforeseen accidents, for a repetition of conditions which have existed during the past week or 10 days."

So much for Chanute and its municipal ownership. What has happened here? The Kansas Electric Power Company's Emporia office has had no complaints of any shortage of gas during the siege of cold. Gas has been burning steadily in furnaces and meters have been humming merrily in basements all over town. Emporia has had all of the gas it wanted to burn.

And as Rolla Clymer said in his El Dorado *Times* in comparing Chanute's shortage with El Dorado's plentiful supply of gas, "There must be a moral in this instance. A shiny red apple will be awarded to the first person making the correct guess."

So here and now we give the devil his due.

Utility Broadcasts to Foreign Language Groups

THE Consolidated Gas Company of New York is now sponsoring a comprehensive program of radio broadcasts to the seven principal foreign language speaking groups of the city. This is generally considered to be the first attempt of a large company to appeal to the large racial groups by means of a sustained and coordinated radio broadcasting program of high merit.

The first of the foreign language radio programs was broadcast on January 27 over Station WBNX. This new air series is being addressed, in native languages, to the large foreign population of the city. It plans to tell how gas and electric appliances can be used to the best advantage and to describe the services the companies offer to their customers. According to the Federal census of 1930, forty-five per cent of the radio sets in New York City are owned by foreign-born white families.

Special programs have been arranged in Italian, German, Polish, Greek, Spanish, Hungarian, and Jewish. The time scheduled for each broadcast was selected, after a careful study of the habits of the various groups had been made, with a view to reaching the greatest number of listeners on each program. Some of the programs run for five minutes only, others last fifteen minutes or three-quarters of an hour. There is one Saturday night program which runs from 11:30 to 12:30.

Conversion of Other Types of Single Phase Watthour Meters to the Detachable Type*

WHERE detachable type meters are installed exclusively in both new and changed meter locations by a supply company, it is, in general, necessary to rebuild a varying number of present owned meters of other types to the detachable type. The number required to be rebuilt depends on several factors and in some instances, due to a combination of circumstances, new meter purchases may supply a sufficient number of detachable meters for the new and changed locations so as to make rebuilding unnecessary at the time. It may also be found necessary to purchase a number of type A meters for old locations from which meters have been removed and which for various reasons cannot be rebuilt for detachable meters.

During the last few years purchases of new meters have been severely limited and in many of the new installations that have been made, meters from old inactive installations have been used when available in the necessary ratings. Only meters in sizes not available in the large numbers of inactive meters that have existed were purchased. In some cases prescribed retirement programs for obsolete types of meters have been continued without curtailment, but replacing meters were not purchased. These two factors have left comparatively large numbers of inactive service entrances of the older types without meters installed and with recent improved conditions these old locations are becoming active again, making necessary the purchase of new meters. If detachable types are used, some rebuilding of these old locations is required and where this has not yet been found possible, type A meters must be purchased for them.

On the other hand, the installation of large numbers of major appliances requiring, in general, larger capacity meters has necessitated the purchase of these meters new and in most of such installations an old type lower capacity meter is displaced. These may be used to help fill up the old vacant locations as necessary and any surplus may be rebuilt as necessary to supply meters of the detachable type for new installations requiring meters of their capacity.

*A report presented to the Meter Service Entrance Subcommittee of the Electrical Equipment Committee, E.E.I., by J. C. Langdell.

Where programs for the rebuilding of services, in order to place meters in present indoor locations on the outside of customers' buildings, are in progress and the detachable meter type of outdoor installations are being made, part of the old types of meters which are removed may be used to replace obsolete types as they are retired, part may be used in old inactive installations where the meters have been removed and which become active again and are not rebuilt, and the balance rebuilt to the detachable type and used in the rebuilt installations. New detachable type meters must be purchased to make up any difference between those required for the rebuilt installations and those meters available for rebuilding.

From this discussion it is seen that for the present and where extensive service rebuilding programs are not in progress, comparatively few meters of the old types will have to be rebuilt and also that, assuming normal conditions of growth in the number of customers to be metered, the number of meters to be rebuilt will increase materially in the next few years until the demand for larger capacity meters will begin to force the retirement of the old small capacity ones, which condition is seemingly indicated by present trends.

Meters to be Converted

It is advisable, in so far as possible, to confine the rebuilding of old meters to the more modern types which have both overload and temperature compensation and purchased since about 1926. This should not be particularly difficult where no extensive service rebuilding program exists, for usually a sufficient number of meters of these types pass through the shops to supply those for rebuilding. If not, it may even be advisable to exchange meters in service so that sufficient numbers of the later type meters will be available for rebuilding. The compensated types are:

Sangamo	Type HC
G.E.	Type I-16
Duncan	Type MD
Whse.	Types OB and OC

Where extensive service rebuilding programs exist or where for other reasons meters of the uncompensated types must be converted, the newer of these meters should be chosen first, if at all possible, since it will surely be necessary to retire some of these meters in the future and the oldest ones, in general, should be the first retired.

The uncompensated types are:

Sangamo	Types H and H-2
G.E.	Types I-14 and I-15
Duncan	Types M and M-2
Whse.	Type OA

Parts are available from the American meter manufacturers for rebuilding all of the types listed above in capacities up to and including 50 amperes 3 wire. Two wire parts are supplied for 2 wire meters and 3 wire parts for 3 wire meters. Two wire parts have a copper jumper across the two right-hand blade terminals, but no potential disconnect is supplied. Three wire parts do not have the jumper, but are provided with a potential disconnect. In some instances the amount of wire supplied for splicing out current coil leads will vary between the 2 and 3 wire parts, but these are the primary differences.

It has been found generally impractical to locally rebuild 50 ampere meters of any type and only capacities up to and including 25 amperes 3 wire should be considered for conversion except by returning to the manufacturer.

Mechanics of Conversion

The actual mechanics of converting meters of the types listed above to the detachable type are comparatively simple. The parts supplied by the manufacturers are in complete individual units and it should be unnecessary to use any other material. A screw driver, pliers, several sizes of drills and taps, soldering iron and solder are all the tools required except for type OA meters and types I-14 and I-16 when parts requiring cutting of the old bases are used.

In the case of the types I-14 and I-16 meters where the parts which do not include a new grid and extended terminals are used, it is necessary to cut the old base so that the grid on which the element is mounted may be used with the other rebuilding parts. This may be done on a lathe or with a hand or power driven hacksaw. The use of a power hacksaw for this purpose is facilitated by a jig to hold the bases while they are cut. In the case of the type OA meters

the projecting ears on the sides of the grid and through which screws pass for fastening the grid to the meter base must be cut off. A heavy bolt cutter may be used to advantage for this purpose or the ears may be sawed off. Where sawing or grinding is necessary, both the permanent magnets and electromagnets should first be removed to prevent filings or dust from getting on or in them, as it is practically impossible to remove such foreign matter if these parts are once contaminated.

One of the most important features of the conversion work is the handling of the coil leads, for the coils may be seriously damaged or the work greatly slowed if the coil leads are improperly handled. Potential coil leads are not much of a problem as they are usually fairly flexible and ordinary care is sufficient. Current coil leads, because of their lack of flexibility, the possibility of damaging coils when reshaping them and the necessity of extending many of them, present more of a problem. First the leads must be carefully straightened and turned in the new direction in which they must go without damaging coil insulation or disturbing in any way present coil turns. The latter is particularly important on open type coils, for if only a small portion of a coil turn is disturbed, difficulty will be encountered later in recalibrating the meter. When extensions are soldered to those leads requiring them, a thorough job must be done and the use of open type soldering sleeves or a satisfactory solderless connector is advisable. It has been found that a sleeve made from ¼-inch standard copper tubing about ½ inch long slipped over the two leads to be spliced and compressed hard in a vise, will provide a good connection for small meters of 5 to 15 amperes capacity. Coil insulation should not be heated in the process of soldering so as to damage it. For some of the larger capacity meters it will be found advantageous to cut all of the current coil leads as short as possible and splice out with longer pieces of the flexible wire provided, as they will then be easier to shape in the required position. Finally, the leads should be cut and shaped in final position after applying the insulating sleeves and before assembly on the base plate, as this will materially facilitate assembly. Parts now supplied for types I-14 and I-16 meters which include a new grid and extended terminals permit all necessary connections to be made without lengthening the coil leads.

The meter manufacturers supply with each set of conversion parts a set of instructions for rebuilding the particular type meter for which the parts are intended. These instructions are quite complete and show the individual rebuilding steps in the proper sequence for efficient handling of the work. They clearly show which leads must be extended and how they should be rearranged and located for mounting on the base assembly and how the various parts are assembled. Means are provided for mounting the meter name plates in visible locations, but no provisions are made for mounting metal company meter numbers when used.

When metal company numbers are used on the meters, special means for mounting them must be devised for most of the types rebuilt. Present practice in this respect varies so widely that a standard method has not been devised and the problem must be solved locally. Holders for company numbers that can be applied are generally available for all types of meters. In the section on metal company numbers following, means are described which may be found applicable in a number of cases.

After a meter is completely reassembled it should be subjected to an overpotential test between all live parts and frame or "Ground" of twice the voltage rating plus 1000 volts before it is recalibrated.

The time required for rebuilding meters will vary with the number to be rebuilt in a given period and the types to be rebuilt. If the work can be arranged so that one type of meter will be converted in sufficient numbers at a time to permit systematizing the operations, the required time will vary between 15 and 30 minutes for each meter, depending on the type being converted. The average time for conversion based on all types and sizes has been found to be approximately 20 min. each where the work can be efficiently arranged. This time does not include recalibration of the meters.

Salvaging of Parts

There will be a number of parts from the watthour meters converted which may be salvaged and used in the maintenance of present meters. A sufficient number of these parts should be saved and used for this purpose. These will generally be glass covers, large wing nuts, cover studs, bases, terminal blocks and terminals.

Mounting Metal Company Numbers

DUNCAN TYPE M-2

About the only mounting space available for the company number plates on M-2 meters is on the lower edge of the name plate. Drill two small holes in the lower edge of the name plate and attach company number by means of small split rivets, keeping the tag low enough so as not to cover up the type number and other important information on the name plate.

DUNCAN TYPE MD

The company number plate attaches to a bracket which clamps around the full load adjustment support. These clamps are available from the Duncan Company.

SANGAMO H AND HC

All HC meters are provided with a company number bracket which attaches to the lower edge of the register. Similar brackets can be obtained for H and H-2 meters from the Sangamo Company. Order number mounting bracket for H-2 meters No. 31282.

G.E. I-14 AND I-15

The company number bracket as furnished with I-16 meters is recommended for use on I-14 and I-15 meters. This bracket mounts on the lower edge of the register and will require the drilling of the dial and plate on early style meters or of the register supporting post on late style meters. Use a No. 49 drill and tap for 2-56, 3/16-inch brass filister head screw which will have to be provided. The number brackets are available from the General Electric Company, Cat. No. 1,287,824.

G.E. I-16

I-16 meters are provided with company number brackets which are mounted under a screw located on the lower edge of the register. The catalog number of the bracket is 1,287,824.

WESTINGHOUSE OA

The company number plate should be mounted to the lower edge of the name plate. Small screws or split rivets can be used for this purpose.

WESTINGHOUSE OB

All OB meters have a space provided on the lower edge of the name plate for the company number. However, on some of the early style meters the name plates are not notched, making it necessary to fix the numbers to the plate. This can be accomplished either by notching the edges of the plate or by riveting the numbers to the plate.

WESTINGHOUSE OC

All OC meters have a space provided on the lower edge of the name plates for the company numbers.

Experience Data for Use in Appraising Low Frequency Inductive Situations*

THE advance determination of the character of an inductive coordination problem, presented by a given situation where a communication line is subject to induction from ground-fault currents on a power line, has in the past frequently involved only an estimate of the magnitude of the maximum induced longitudinal voltage. The steps required for an estimate, under specified conditions, of the maximum longitudinal induced voltage, namely, the calculation of fault and residual current, calculation or measurement of coupling, and calculation of shielding for non-variable shielding systems have been treated in considerable detail in Engineering Reports of the Joint D & R Subcommittee and technical articles. However, for a proper appraisal, it is evident that a knowledge of this voltage alone is quite insufficient. Among other things, it is necessary to have an adequate conception of the frequency with which longitudinal voltages of various magnitudes within the range of practical significance may be expected to occur. This, in conjunction with knowledge of the characteristics and service requirements of the communication system, affords a basis on which to estimate the possible effects of the induction. Prior to the preparation of Engineering Report No. 35 of the Joint Subcommittee on Development and Research, which has just been approved for publication, experience data covering these subjects have not been available generally.

This report deals principally with three items: (1) methods of determining the probable frequency with which various percentages of the maximum voltage are likely to occur; (2) a method for allowing, in shielding estimates, for the random variation (within limits) in breakdown voltage of telephone protectors; and (3) comparisons between calculated and observed voltages for a number of exposures. Some data on the effects of induction on the telephone plant and the causes of the disturbances are also given.

Most of the data for the report is based upon analysis of records from automatic oscillographs. These data were not taken specifically for the purposes of this study, but were obtained over a period of several years from exposures under study for other reasons, in some cases as specific coordination problems, and in others to obtain information as to the nature of the inductive situation. The observations are from 29 exposures to 60-cycle power systems covering a wide variety of physical conditions. The shortest period of observation from which data have been used is five months, and the longest period six years.

Data on the frequency of occurrence of induced voltages which may be expected to exceed a particular per cent of the maximum observed value are given in the form of cumulative percentage curves for individual exposures. Average curves have also been prepared which may be used in studies of other situations. The shape of these curves for individual exposures depends upon both fortuitous factors which must be treated statistically, and factors which are dependent on the characteristics of the individual system. The latter are subject to theoretical analysis. A theoretical investigation of the influence on such curves, of factors such as the physical characteristics of the exposure, the shielding due to conductors whose protectors operate, etc., led to the development, under certain simplifying assumptions, of a theoretical method of obtaining voltage distribution curves. This development, which is given in an Appendix, and illustrated by examples, leads to a better understanding of the influence of non-random factors in determining the shape of distribution curves.

The maximum observed voltage for each exposure has been compared with the maximum estimated voltage. Although in individual cases there are large discrepancies between these values, positive and negative deviations are on the average about equal, so that no consistent error in the method of calculation is indicated. In the past calculations of the maximum longitudinal induced voltage have not ordinarily taken into consideration the shielding resulting from telephone circuits with operated protectors. The calculation of this shielding is often difficult and frequently impossible of accurate solution but in many cases it has been found to be very important. This shielding has been found to introduce large uncertainties in some of the calculated voltages which have been compared with voltages observed in this study. A section of the report, therefore, deals with methods of estimating this shielding.

The comparisons of the observed with the calculated voltages, have naturally led to a careful examination of other factors that might be responsible for discrepancies. A broad point of view, which thus became necessary in the study itself, will be of value, it is thought, in understanding the place that the material treated in this report holds with respect to other factors entering into a satisfactory appraisal of a proposed new low frequency inductive coordination situation. The following paragraphs are intended to provide such a background.

Factors Entering Into the Appraisal of a Low-Frequency Induction Problem

A first step is an estimate of the maximum open-circuit longitudinal voltage induced in the telephone line (disregarding shielding effects from telephone wires with operated protectors). This involves the computation of the residual current through the exposure and the computation or measurement of the coupling between the power line and the telephone line.

Residual current distribution for a ground-fault at a specified location on the power system may be calculated by the method of symmetrical components, provided items (a) to (e) below are known. In actual situations, some of these factors are not definitely fixed, and are, to some extent, the cause of the fortuitous variations which are a principal subject of this study.

(a) *Circuit Impedances*—These are determinable directly from line and apparatus characteristics.

(b) *Generator and Transformer Capacities*—Changes are, of course, made from time to time in the power supply capacity connected to power systems. In many types of situations, changes of this character have only minor effects upon induced voltages. In others, as where the exposure is close to a main power source with high line-voltage or where changes in the capacity of grounded neutral transformers are involved, the effects are important.

(c) *System Connections*—Particularly at times of general disturbances on power systems, such as during severe lightning storms or other emergency conditions, changes in system connections may be made which have

*A Review of Engineering Report No. 35.

a material effect on residual current magnitudes in various parts of the system.

(d) *Fault Resistance*—This is one of the more important random variables and has been the subject of another report.[1]

(e) *Location of Fault*—Where, for example, two-ended feed is involved, it is necessary to consider the sequence of switch operations occurring as a result of the fault. Also in some cases, sections of exposure at wide separation, if long, have effects which may be overlooked. The fault location for the largest induced voltage may also be radically changed by changes of the kind discussed under item (c).

The coupling between a power and a telephone line, while it may differ from its estimated value, is not subject to random variation. However, estimates of coupling not based on measurements may introduce large errors in calculated values of voltage. The Project Committee considered it necessary to make measurements on several exposures used in this study in order to minimize the possibility of errors from incomplete coupling information. Methods of calculating coupling and of making tests to determine it are covered in considerable detail in another report. [2]

A second step in the problem consists in modifying the maximum computed voltage for the effects of such shielding as may not have been explicitly included in the value of coupling used in the estimates. The effects of shielding due to ground-return circuits such as ground wires on power lines, grounded cable sheaths, and other permanently grounded conducting structures (such as water pipes, etc.) which are regarded as permanent installations, are calculable by methods outlined elsewhere. [3] Other shielding for which allowance must be made is that due to currents in communication conductors to which grounded terminal equipment is connected, or on which protectors have operated. Shielding following protector operation is calculable by the same general methods as shielding from permanently grounded conductors, but is dependent on the number of operated protectors, and therefore upon the induced voltage, the voltage distribution with respect to ground, and the operating voltages of the protector blocks, which, between certain voltage limits, are randomly distributed. A method of approximating the voltage across protectors and the number of conductors grounded by protector operation is described in this report. The analysis has indicated that these phases of the general problem of appraising low-frequency inductive exposures need further consideration.

Having obtained an estimate of the maximum longitudinal voltage liable to occur on the telephone line, it is necessary to consider how frequently various percentages of this voltage are likely to appear. This involves, in the first place, consideration of the probable frequency of occurrence of faults. This is to be based upon data preferably applying to the particular line or system under study, but if these are not available, then from general statistical data on the subject. In addition to this, the distribution of faults with respect to the exposure location is obviously important. In the absence of information to the contrary, uniform distribution with respect to circuit-mileage may be assumed. It seems probable, however, that in many situations, faults tend to occur within certain ranges of location more frequently than elsewhere. In the cases studied in this report, little information respecting such a tendency was available. It is evident also that more or less unpredictable variations in items (b), (c) and (d) above affect the frequency of occurrence of induced voltages within given magnitude ranges. While it would no doubt be possible in some cases to make some allowance for the effects of these different variables, to do so in any comprehensive manner would usually involve a large amount of work, even assuming the necessary information were available. The average voltage distribution curves from the actual exposures include the effect of such variables, and these curves, supplemented by the theoretical study of Appendix II, of this report, appear to offer, at least for the present, the best basis for deriving distribution curves.

The final step is to consider the effects which may be experienced in the telephone system from the voltages as estimated, and the frequency of occurrence of such effects in relation to service requirements and to disturbances from other causes. Here an important item is the distribution of the induced voltage with respect to ground, which depends upon the character of the communication plant, the mileages and the relationships of the different circuits involved, the nature and location of ground connections if any, etc., all with respect to the exposure location. As has been stated hitherto, the experimental data underlying this report contain nothing relating to the distribution of induced voltage-to-ground. Whether protectors will operate depends of course upon the voltage-to-ground at protector points. Whether they will be permanently ground depends upon their previous history and upon the magnitude and duration of the current through them. The study has brought out rather clearly, as an item to which more attention might be paid, the dependence of this current magnitude upon the effective ground-return impedance of each telephone wire between protector points, as well as upon longitudinal voltage.

This report will be included in Volume 3 of Engineering Reports, which is now being printed. Individual copies in mimeograph form are available. The prices of these individual reports are 80 cents for members of the E.E.I. and $2.00 for non-members.

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[1] Fault Impedance and Related Problems, Provisional Report No. 10, Joint Subcommittee on Development and Research, N.E.L.A. and Bell System.

[2] Coupling Factors for Ground Return Circuits—General Considerations and Methods of Calculation, Engineering Report No. 14 of the Joint Subcommittee on Development and Research, Vol. II, Page 121.

[3] Shielding of Ground Return Circuits at Low Frequencies; Engineering Report No. 26, Joint Subcommittee on Development and Research, N.E.L.A. and Bell System.

Nebraska Association Safety Conference

AN all-time attendance record was made at the ninth annual safety conference of the Nebraska Electric Association when three hundred nineteen men attended the one-day meeting at Omaha on February 22.

This conference is growing steadily in importance in both the minds of employees and executives. The carefully prepared program emphasizes each year round table discussion in which the men, representing in the aggregate all departments, are encouraged to take a vigorous part. Where several years ago they were reluctant and diffident in personal participation, that attitude has been eliminated and discussions are lively.

The one address, made by Roy Page, Vice-President, Nebraska Power Company, discussing "An Executive Point of View of Safety Work," was broadcast from three stations.

Subjects of discussion were as follows: A Word Picture of an Accident; Testing Company Automobile Drivers; First Aid Demonstration; Discussion of First Aid from the Floor; Presentation of Safety Awards for Best Company Lost-Time Record During 1935; Word Picture of a Puzzling Accident; Comments on the Day's Program.

Selling Air Conditioning in Philadelphia

By H. H. Mather

Philadelphia Electric Company

From an article in the *U. G. I. Circle*

MOST of us consider air conditioning as air cooling and our thoughts in connection with the subject do not usually go beyond this point. We seldom think of it as an all-year function, and overlook the finer points that render it of real value to humanity.

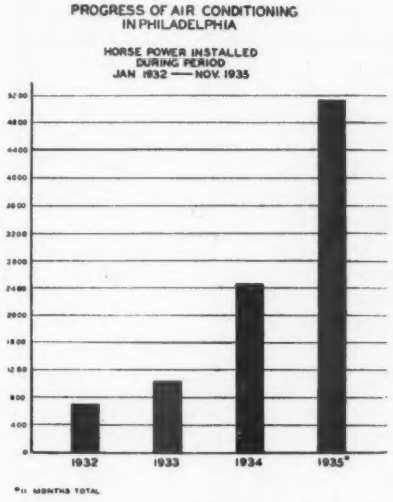
The fact is that complete air conditioning includes the control of temperatures, humidity and air circulation in all seasons of the year, and that a properly designed and installed air conditioning system provides these temperatures and humidities without drafts. It also controls the dust and bacteria content of the air by filtering and washing, controls odors by adequate ventilation and may utilize ozone in the near future to destroy the causes of odors.

The air filter and the air washer which form a part of the air conditioning system will remove dust, dirt and pollen from the air, and as a result such nuisances as hay fever, rose fever and nasal irritations are eliminated, resulting in fewer absences and more efficient work from the personnel.

These facts and the fact that air conditioning of commercial establishments will attract business have received widespread acceptance in Philadelphia.

The activities of the Philadelphia Electric Company with relation to this outstanding development have been so fruitful that the method of market attack has been followed in many other cities. These activities include the determination of the economic value of various applications and direct-by-mail advertising campaigns in cooperation with manufacturers to sell air conditioning.

The general acceptance of air conditioning will follow the determination and realization of its economic value (considering economic value in its broadest sense, which includes the comfort and convenience inherent in the application). The Philadelphia Electric Company has conducted numerous economic studies to determine the value of air conditioning and has made two outstanding contributions to the knowledge of this phase of the subject. The first was the study in the Philadelphia plant of the American Tobacco Company, in which the effects on production, lost time, efficiency and labor turnover were evaluated. The second was a study of the effect on the health of employees in the air conditioned offices of the Philadelphia Electric Company.



In 1932 it became apparent that we could not expect a continuation of a number of large-scale installations each year and that if our air conditioning load was to grow rapidly such growth must be obtained from a relatively large number of smaller installations. At that time we made our first attempt to utilize direct-by-mail advertising in the sale of commercial and industrial power. The first campaign was conducted in the spring of 1932 with a group of air conditioning manufacturers cooperating. The direct-by-mail advertising was sent out on a definite schedule to stores and restaurants and immediately followed up by our salesmen. The good prospects were then followed by the participating manufacturers in cooperation with our salesmen in an effort to sell the job as soon as possible.

This initial effort was so successful that the air conditioning campaigns have since been extended to include industrial plants, stores, restaurants, miscellaneous commercial establishments and better-type residences. We plan to further extend the activities during 1936 and include air conditioning for office buildings, department stores, theaters, banks and apartment houses.

The effectiveness of this method of selling is well illustrated by the growth of annual sales of air conditioning in Philadelphia during the period Jan. 1, 1932, to Nov. 30, 1935, and is shown in the Figure.

In a very few years we have witnessed a phenomenon possible only in this twentieth century civilization. Air conditioning has been accepted by American business as a commercial necessity. First the theaters, then the railroads, now the department stores, hotels, specialty shops and restaurants.

There is no question of the commercial value of air conditioning to the department store owner, the theater owner, or the office building owner who leases his space. All of these people have, time and time again, found that air conditioning greatly increases the revenue obtained from their business. This general acceptance has progressed to such a point that we should pause and bend every effort toward the prevention of inadequate and improperly designed installations.

If, in the inevitably greater accelerated installation of air conditioning equipment, the business can be protected against the over-enthusiastic promotional methods of unqualified individuals, the market will be developed in an orderly, rational manner to the profit of both the industry and the community. If, on the other hand, this protection cannot be assured, air conditioning by means of which man can create or alter at will, within walls, any or all of the atmospheric conditions that nature produces, will lag in its development, with the result that the industry will suffer and the community will be unable to take rapid advantage of one of the biggest forward steps that science has made to insure the health and well being of humanity.

REMINDER

Company Prize Competitions for 1936

Companies intending to compete for the Charles A. Coffin Award, the Augustus D. Curtis Award, the George A. Hughes Award and the Thomas W. Martin Award are reminded that exhibits for these competitions must be forwarded to the Secretary of the Institute not later than April 1, 1936.

Air Conditioning Gains in Louisville

By Bert Y. Johnson

Louisville Gas & Electric Co.

From an article in *The Synchronizer*

THE first installation of air conditioning was made in Louisville in 1926, and stood alone that year. Since that time the expansion of its field is best reflected in this tabulation of yearly installations in this city:

1926	1
1928	1
1929	1
1930	1
1932	4
1933	11
1934	31
1935	45
Total	95

Air conditioning is not a passing fancy, but is a new element in life and will, in the course of time, do as much toward making us stay at home to obtain summer comfort as has the automobile contributed toward making us leave home to get a breath of fresh air or to find a cool spot. It is truly beyond the fondest dream of little more than a decade ago that man would be able to regulate the actual weather conditions under which he is to live, or work in an enclosure. Many ingenious devices have been made by man, but certainly none of more far-reaching importance has been devised than that which promotes health, aids industry, speeds production, prolongs life and makes that prolonged life more pleasant throughout.

Riding on the high wave of public adoption of air conditioning are many products bearing the name of air conditioning. For instance, one may see air-conditioned shoes, hats, or clothing advertised for sale. It may well be kept in mind that the National Better Business Bureau, Inc., has set forth a ruling on the use of "air conditioning" in advertising, and defined it as follows:

(1) Summer air conditioning should, as a minimum, cool, dehumidify and circulate the air;

(2) Winter air conditioning should, as a minimum, heat, humidify, and circulate the air;

(3) Year-round air conditioning should, as a minimum, cool and dehumidify the air in summer, heat and humidify it in winter, and circulate it.

Louisville is not taking a back seat in the installation of air-conditioning equipment, which is more forcibly brought out by the actual data in figures. Of the 95 installations here now, 22 are in stores, 9 are in theaters, 9 are in restaurants, and 25 are in residences. The rest are to be found in industrial plants, offices, radio stations, etc.

There are at present about 2050 horsepower in motors used for air conditioning connected to the lines of the Louisville Gas & Electric Company. These motors will consume in one summer season approximately 1,710,000 kwhr. of electric power and for which the company will receive about $42,000.

There is no good reason why men should not give as much thought to the production of comfort cooling for the hot, sultry days as they have given in the past to the production of comfort heating in the winter. Truly enough, the cost of the equipment for providing summer comfort is much higher than that involved in a heating plant for residential use, but when it is considered that summer air conditioning is in its infancy and none of the advantages of mass production are yet available, it is only fair to assume that it will be only a very short time until the great "middle class" of our population will be able to modernize their homes to make them just as impervious to the hot blasts of summer as they are now to the frigid winds of winter.

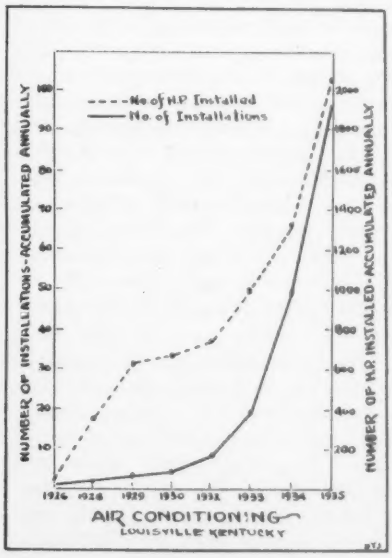

No. of H.P. Installed
No. of Installations
NUMBER OF INSTALLATIONS-ACCUMULATED ANNUALLY
NUMBER OF H.P. INSTALLED-ACCUMULATED ANNUALLY
1926 1928 1929 1930 1932 1933 1934 1935
AIR CONDITIONING
LOUISVILLE KENTUCKY

Chart of Air-Conditioning Development in Louisville from 1926 to 1935

Many devices are being offered to the gullible public under the guise of air conditioning for a few dollars, but in considering such equipment it is advisable to consider the points as set out in the definition of air conditioning by the National Better Business Bureau. In all fairness to these above-mentioned devices, there are some which will help considerably in producing partial relief from torrid weather, but unless they are capable of doing a complete job they are not justly entitled to use the term "air conditioning" in connection with the apparatus. When it is considered that a cooling, dehumidifying, circulating and filtering device sufficient to handle a large living room costs, on the present market, in the neighborhood of $500, it is folly to expect that a so-called air-conditioning unit costing $200 or $300 will convert your hot, stuffy home into a springtime paradise. As production methods improve, sales are more numerous and possible efficiencies are effected, no doubt the present price levels will be subject to a very marked decrease, but for the present the age-old saying, "You can't get something for nothing," may well be the guide of those who aspire to summer air conditioning for residential or commercial use.

Commercially, air conditioning has very decided monetary values aside from the mere ability to make people more comfortable. The invigorating coolness of an air-conditioned place of business attracts additional patronage, saves loss from soilage because the air is filtered, enables employees to actually produce more work by lessening the depressing conditions which produce fatigue, reduces costly errors by promoting clearer thinking and often gives absolute relief from hay fever and asthmatic troubles. Colds, the most common cause of loss of time from regular duties, are seldom developed where accurate and proper control of air conditions is maintained.

There is no question that air conditioning as a great achievement and a contribution to humanity is here to stay, and to gain its rightful position in residential, commercial and industrial life. The experimental stage is past; it has proved its worth; let us all acquaint ourselves with our new benefactor.

Uncle Nick Barton on TVA

Sage and Patriarch of O'Reilly's Cove Long an Advocate of Rural Electricity—Favors Anything That Will Relieve Drudgery and Brighten Farm Existence, but Unalterably Opposed to Government in Business—Chuckles Over "Marble Game"

By R. H. FitzGerald, Jr.

In the Chattanooga Times of Feb. 23, 1936

IT was a fine, clear, bracing day last week that I turned up the road that leads into O'Reilly's cove to pay a visit to my old friend, Uncle Nick Barton, 86-year-old patriarch of that quiet mountain community.

A cloudless blue sky was overhead and the air held an invigorating zest, O'Reilly's creek was in a chattering, boisterous humor as I crossed the bridge and wended my way toward the old house on the slope of the ridge.

For all the brightness of the day, the drabness of winter was still everywhere in evidence, except where the evergreens stood out on the dun mountain sides.

I found the old man in the great living room, with its raftered ceiling and open fireplace. The old spinning wheel, now little used, was in the chimney corner. Over the massively hewn mantelpiece were a pair of antlers, evidently placed there by some earlier Barton or O'Reilly before the highly civilized white man had robbed the woodland of its game as well as its timber.

Slight Touch of Grippe

"Come in this house," he croaked in a husky voice, "have a cheer and set down." I noticed that he had his throat muffled up in a flannel cloth. Before I could make inquiry he said:

"Got a slight tech of this here gosh danged grippe an' the gals has me all doctored up here with somethin' that smells wuss'n hell an' I ain't supposed to set foot outer th' house ontil Saturday. What I'd call one hell of a note fer a growed-up man. Danged iffen I don't believe I must be a-gittin' old."

"Have you had a doctor," I inquired.

"Shore," he growled. "The gals sent for one an' th' fust thing he done was to say I couldn't have no toddies ontil I got well."

"What did you do?" I asked.

He shot me a flashing glance from those fierce old eyes that no sickness or adversity could completely dim. "Changed doctors," he replied promptly. "Didn't figger hit was safe to have a man that ignorant around."

We drew up to the table where reposed, as usual, what the old man called the essential ingredients—a stone jug stopped with a corn cob, a cracked old sugar bowl, covered with faded blue and yellow painted flowers, an old fashioned brassbound water bucket of cedar, with a glass dipper and glasses. A cheery fire of logs leaped and crackled on the big open hearth, throwing lances of light into the darkened corners, and casting grotesque shadows on walls and ceiling. It was, all in all, a very snug and satisfactory retreat in which to recover from the grippe, and I ventured to say so.

"Mebbo so," he grumbled, "but I'm a-rarin' to git outer here. Sickness is all right fer them that enjoys hit, but hits too gosh-danged confinin' fer me. I never did like to be hemmed up."

Sweetness of Forbidden Things

He fell to the mixing of one of his forbidden toddies, and as I followed suit I pondered at the perversities of human nature that lend added sweetness to forbidden things.

His mixture perfected, with just the right quantity of water and not a grain more than the proper amount of sugar, the old man took a deep sup and sprawled back in his chair, sweeping back with the gnarled forefinger of a huge hand the white, flowing mustaches that curved around his ruddy, weather-beaten old cheeks like scimitars.

"Well," he remarked at last, with great deliberation, "I see theys a great deal in th' papers about th' TVA. The soopreme court opinion seems to be right pop'lar all around here."

"I suppose," I prodded him, "that as a rabid anti-new dealer it's not so popular with you."

"Now, son," he admonished me, mildly, "hold yer gosh-danged hosses an' don't go off half-cocked. That's th' trouble with you young fellows—ye don't stop to think. As a matter of fact I was a-arguin' in favor of dammin' up the rivers an' a-puttin' of 'electricity in reach of the farmer long afore this here new deal nightmare was ever dreamed of. I'm still in favor of hit. No man that's watched th' wimmin folks a-toilin' theirselves away doin' th' drudgery of farmin' an' no man that set back lonely an' solitary an' watched his boys an' gals, own flesh an' blood, agoin' away from th' land because o' th' hardships an' th' dreariness of hit an' th' brightness, or what they reckoned was the brightness of the danged opportunities in th' city, no sech man would ever say a word agin some of th' purposes of this here TVA.

Sot Agin It

"But they's one danged thing I'm gosh-danged sot agin, an' I won't never change, an' that's the idee of the gover'mint in bizness in any way, shape, form or fashion whatsoever, now or any time. I don't own no power company stock, fer ever' dollar I could get ahead went into this here land, but when a gover'mint taxes private bizness an' then, without payin' taxes, sets hitself up as a gosh danged competitor of that private bizness ye've got a situation that hain't right, an' a 10-year-ol' boy kin see hit."

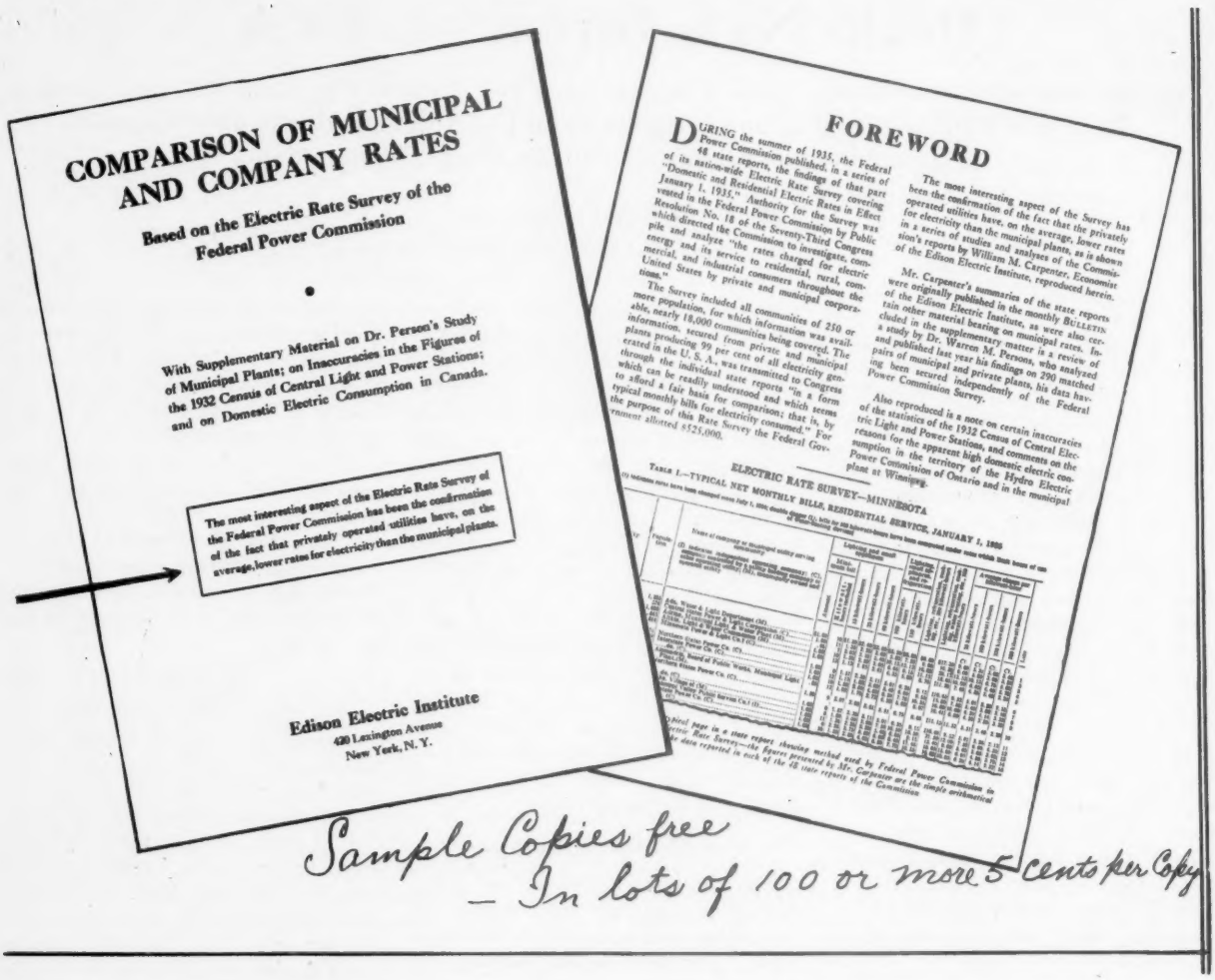
"But," I interrupted him, "how long would you have waited for the privately owned utilities to build transmission lines to the farm?"

"Son," he replied simply, "I jest don't know. Maybe ferever, at least some folks think so. They'll probably do hit now, them that stays in bizness.

"D'ye know," the old gentleman mused, "iffen ever' bizness that is fortunate enough not to have no competition was to conduct hitself as iffen hit did have, hit would be a gosh danged fine thing all eround—mought turn out right profitable in th' long run."

"It seems quite possible that the city of Chattanooga will start the building of a line of its own right away," I observed.

"Yes," he chuckled hoarsely, "I see in the paper whar they didn't make no headway a-buyin' 'em a ready-made plant. Seems this here feller Guild sorter patted 'em on th' head and sez: 'Boys, hit wouldn't hardly be wuth our while


COMPARISON OF MUNICIPAL AND COMPANY RATES
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to start no marble game ontil you boys kin git yore hands on more marbles.' "

Funny, Even to Sick Man

The old man leaned back in his chair and cackled in his cracked voice. "Hit's shore a gosh-danged funny world," he opined, "even to a man with th' grippe."

"Well," he resumed after a pause, "I was here afore they thought of Muscle Shoals or th' TVA, but I'll be up in th' churchyard long afore ye'll hear th' last of hit. Iffen th' development goes on I kin see a great future fer this here valley, a great future. The changes hit will make, or could make, is danged hard to figger. The good that hit kin do is likewise hard to figger.

"An' the cost of hit," he grinned, "is somethin' that'll call fer a bit of figgerin', too, but I guess th' good'll more likely offset th' bad an' as I was a-sayin' I won't be here nohow, onless they hurry."

I didn't like the trend of his thoughts, so I introduced the subject which never failed to strike a spark.

"By the way," I observed, "I notice they're all in a rush to get through up in Washington so the statesmen can come home and get ready to offer their unselfish services to the people for another term of office."

"Why'n hell," he growled, shooting me a dark look, "did ye have to mention that gosh-danged bunch to me, a-feelin' bad already? Yep, they'll be a swarmin' back afore long, with their hearts full o' noble thoughts an' their records as full of holes as a danged fish net."

Hard to Say Which Is Worse

"I have never been able to figger out," he resumed, "which is wuss, a-having 'em up thar in Washington a-tinkerin' at th' machinery, or a-havin' em down here whar ye have to listen to them a-tellin' a bunch o' gosh-danged open-mouthed yahoos how they saved th' country an' how th' AAA would a-been constitutional iffen hit had been drawed like they wanted hit to be."

"You don't really feel that way about all congressmen, do you?" I asked, rising to go.

"Oh, I guess not, I guess not," he admitted grudgingly. "I've knowed this here congressional deestrict to have some good, able men, and I've knowed four of our United States senators from this state. One of them was wuth knowing."

"Which one was that?" I asked, pausing in the doorway.

"Figger hit out fer yoreself," he croaked.

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POWER SALES ITEMS

AIR CONDITIONING

"Air Conditioning Office Buildings." *Power Plant Engineering*, February, 1936, p. 120. Technical Publishing Company, 53 West Jackson Blvd., Chicago, Ill.

Topeka, Kan., has first large office building west of the Mississippi to be completely air conditioned.

"Cooling Tower Inside, Machinery Room Outside in Air Conditioning of U. S. Treasury," by L. K. Berman, P. K. Gerhardt. *Heating and Ventilating Magazine*, February, 1936, p. 25. The Industrial Press, Publishers, 148 Lafayette Street, New York City

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"Air Conditioning Definition." *Electrical Production*, January, 1936, p. 13. Electrical League of Cleveland, Inc., Publishers, Builders Exchange Building, Cleveland, Ohio.

What functions are involved in complete and partial air conditioning.

"Air Conditioning a Production Tool Since 1926 at Bayuk Cigars Plant in Philadelphia," by R. D. Touton. *Heating, Piping & Air Conditioning*, January, 1936, p. 14. Keeney Publishing Company, 6 North Michigan Avenue, Chicago, Ill.

"Keeping the Heat Out of Treated Space Leads to Economy in Air Conditioning," by L. T. Avery. *Heating Piping & Air Conditioning*, January, 1936, p. 22. Keeney Publishing Company, 6 North Michigan Avenue, Chicago, Ill.

CONTROLS

"Automatic Controls—What They Are and What They Do." *Heating and Ventilating Magazine*, February, 1936, p. 21. The Industrial Press, Publishers, 148 Lafayette Street, New York City.

An explanation of the types of automatic controls and their use in heating, ventilating and air conditioning systems.

DIESEL ENGINES

"Diesels Heat a Town." *Power*, February, 1936, p. 93. McGraw-Hill Publishing Company, Inc., 330 West 42nd Street, New York City.

A brief article describing the heat recovery on a Diesel plant at Claivivre, France. This article describes the methods used, the heat recovery and the means of distribution in a general way for the heating of houses and other buildings.

ELECTRIC APPLICATIONS

"Power at Work in Industry." *Electrical World*, January 18, 1936, p. 56. McGraw-Hill Publishing Company, Inc., 330 West 42nd Street, New York City.

Three items which contain ideas for power sales:

1. Improved mat quality with electric heat
2. Potatoes dried by 9 kw space heaters
3. Blower removes keg lacquer vapor.

"Power at Work in Industry." *Electrical World*, February 1, 1936, p. 56. McGraw-Hill Publishing Company, Inc., 330 West 42nd Street, New York City.

Four items which contain ideas for power sales:

1. Die hardening gains with electric heat
2. Small parts brazed in batch furnace
3. Electric service modernizes plant
4. Fireproof portable power vault.

ELECTRIC FURNACES

"Effect of Type of Surface on Radiation Loss from Furnaces," by G. J. Cross. *Combustion*, January, 1936, p. 33. Combustion Publishing Company, Inc., 200 Madison Avenue, New York City.

Basic formulas and curves for determining the heat loss and the effect of different emissivity factors for various surfaces.

ELECTRIC HEATING

"Uses of Electricity in Tanneries." *Electrical Production*, February, 1936, p. 10. Electrical League of Cleveland, Inc., Publishers, Builders Exchange Building, Cleveland, Ohio.

Several processes requiring heat are mentioned, with notes on the advantages of electricity for these purposes.

ELECTRICITY

"What Is Electricity?" by P. R. Heyl. *Electrical Engineering*, January, 1936, p. 4. American Institute of Electrical Engineers, Publishers, 33 West 39th Street, New York City.

Tracing the interesting history and significance of the many concepts of electricity as they have evolved from an indefinite beginning through the extremely rapid developments of the current century toward a speculative future.

FANS

"Selecting Motors and Controls for Large Fans," by R. C. Allen. *Electrical World*, February 15, 1936, p. 459. McGraw-Hill Publishing Company, Inc., 330 West 42nd Street, New York City.

Calculation of acceleration time and current. Protection during starting and running. Torque reversal with drop of speed. Synchronizing requirements.

INDUSTRIAL ELECTRIFICATION

"Economics of Aluminum Production." *Industrial & Engineering Chemistry*, Industrial Edition, February, 1936, pp. 146-152. American Chemical Society, Publishers, 330 West 42nd Street, New York City.

Cost of electricity, choice of plant locations, and other problems discussed.

"Coal Mine Mechanization." *Coal Age*, February, 1936, p. 37. McGraw-Hill Publishing Company, Inc., 330 West 42nd Street, New York City.

Survey of progress during 1935 with special reference to electrical applications.

"Steel Industry Electrical Developments." *Blast Furnace and Steel Plant*, January, 1936, pp. 71-73. Steel Publications, Inc., 108 Smithfield Street, Pittsburgh, Pa.

Activities and trends in the application of electricity in steel plants discussed.

PASTEURIZATION

"Milk Pasteurization." *Electricity on the Farm*, February, 1936, pp. 11-13. Case-Shepperd-Mann Publishing Corporation, 24 West 40th Street, New York City.

New electro-pasteurization insures uniform generation of heat throughout all portions of the milk.

POWER SALES

"Power Sales Handbook." *Electrical World*, January 18, 1936, p. 56. McGraw-Hill Publishing Company, Inc., 330 West 42nd Street, New York City.

The first of the industrial data sheet series to serve power sales engineers and electrical engineers in industries that should be using more electrical equipment.

"Power Sales Handbook." *Electrical World*, February 1, 1936, p. 60. McGraw-Hill Publishing Company, Inc., 330 West 42nd Street, New York City.

The second of the industrial data sheet series to serve power sales and electrical engineers.

STATIONS—CENTRAL

"Interruption in New York's Electric Service Explained." *Electrical World*, February 1, 1936, p. 350. McGraw-Hill Publishing Company, Inc., 330 West 42nd Street, New York City.

New York Edison's Hell Gate station operating main and auxiliary buses at time with initial ground fault believed to have been in former. Neutral grounding connections from generators burned off.

"What Really Happened at Hell Gate Station of the New York Edison Company." *Power*, February, 1936, p. 97. McGraw-Hill Publishing Company, Inc., 330 West 42nd Street, New York City.

New York's worst power failure began at 4.16 p. m., January 15, when 60-cycle busbars at Hell Gate station shorted and started a train of power failures.

WELDING

"Resistance Welds Widely Used," by George H. Hall. *Electrical World*, January, 18, 1936, p. 226. McGraw-Hill Publishing Company, Inc., 330 West 42nd Street, New York City.

Characteristics of butt, flash, spot projection and seam welding. Indications of fields where successfully adapted.

"Arc Welding." *Electrical World*, February 1, 1936, pp. 32-35. McGraw-Hill Publishing Company, Inc., 330 West 42nd Street, New York City.

Modern methods and equipment described.

"Arc Welding Apparatus," by E. Steinert and W. W. Reddie, Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa. *Iron & Steel Engineer*, January, 1936, p. 9. Association of Iron and Steel Electrical Engineers, Publishers, Empire Building, Pittsburgh, Pa.

A paper presenting the developments in arc welding giving various welder designs and control.

Clifford S. MacCalla

CLIFFORD S. MacCALLA, vice-president and division manager of the Ohio Edison Company, Youngstown, died suddenly on Feb. 5. Mr. MacCalla was born in Wallingford, Pa., and was a graduate of Lehigh University. He became identified with the Ohio properties in 1923 and at that time was already equipped with extensive experience in utility operation, both in the power and railway fields. Mr. MacCalla spent a short period of service with the telephone and electric companies of Philadelphia and with the Edison Electric Illuminating Company of Brooklyn, now the Brooklyn Edison Company. He then entered the foreign department of the General Electric Company and was appointed principal assistant engineer in charge of the installation in Sydney, Australia, of the generating plant, substations and railway equipment for the tram lines of the New South Wales Government. Later he went to Schenectady and subsequently returned to the Brooklyn utility.

In 1903 Mr. MacCalla began a 15-year service with the Washington Water Power Company, Spokane, successively as assistant to the general manager, assistant general manager, general manager, and vice-president and general manager. Returning East, he became vice-president and general manager of the Virginia Power Company of Charleston, W. Va., and was also identified with the Coalburg Colliery Company, Ronda, W. Va., as vice-president. His next move was to Ohio, where he took a prominent part in the affairs of the East Central Division of the old National Electric Light Association. Mr. MacCalla was a Fellow of the American Institute of Electrical Engineers and a member of the American Society of Civil Engineers.

Convention

(*Continued from page* 73)

water sprays to take out soluble gases such as sulphur dioxide and controlled as to humidity. In summer the sprays are cooled by means of a 1,200-ton refrigeration plant so as to maintain a temperature differential between outside and inside air from 0 to 15 F., as needed. This properly conditioned air is distributed through a very extensive duct system and introduced into the various spaces in such a manner as to cause no perceptible drafts or clammy, uncomfortable feeling.

CONVENTIONS AND MEETINGS

MARCH

23-27 Third Annual Sales Conference and Sales Committee meetings, Edgewater Beach Hotel, Chicago, Ill.
23-24 National Power Sales Conference, Edgewater Beach Hotel, Chicago, Ill.

APRIL

20-24 Midwest Power Engineering Conference, Chicago, Ill.
23-25 Electrochemical Society, Cincinnati, Ohio.
27-30 Chamber of Commerce of the U.S.A., Washington, D. C.
29-30 Missouri Association of Public Utilities, St. Louis, Mo.
30 Southeastern Electric Exchange, Fort Sumter Hotel, Charleston, S. C.

MAY

1 Southeastern Electric Exchange, Fort Sumter Hotel, Charleston, S. C.
1 Missouri Association of Public Utilities, St. Louis, Mo.
4-9 National Electrical Wholesalers, Hot Springs, Va.
10-11 Hydraulic Power Committee, Statler Hotel, Detroit, Mich.
10-11 *Accident Prevention Committee, Statler Hotel, Detroit, Mich.
11-12 Prime Movers Committee, Statler Hotel, Detroit, Mich.
11-12 Electrical Equipment Committee, Statler Hotel, Detroit, Mich.
11-14 National Fire Protection Association, Atlantic City, N. J.
12-13 Transmission and Distribution Committee, Statler Hotel, Detroit, Mich.
25-28 National Electrical Manufacturers Association, Hot Springs, Va.

JUNE

1-4 EDISON ELECTRIC INSTITUTE, Opera House, Municipal Auditorium, St. Louis, Mo.
17-20 The American Society of Mechanical Engineers, Dallas, Texas.
22-26 American Institute of Electrical Engineers, Pasadena, Cal.

SEPTEMBER

7-12 Third World Power Conference, Washington, D. C.

OCTOBER

26-30 American Gas Association, Atlantic City, N. J.

* Tentative

Missouri Association Convention in April

THE Missouri Association of Public Utilities will hold its annual State convention this year on April 29, 30, and May 1 in St. Louis, Mo., at Hotel Jefferson. C. E. Michel, Union Electric Light & Power Company, St. Louis, is president. The membership of the Association includes virtually all of the privately owned electric, gas, and water companies in Missouri. About 250 delegates are expected to attend.

Among the speakers and their subjects will be: "Electricity in the Olden Days—and Now," Alex Dow, Detroit, Mich., President, Detroit Edison Company; "Through the Years in the Gas Industry," L. B. Denning, Dallas, Tex., President, American Gas Association; "Hazards to Water Supply Due to Faulty Plumbing," W. Scott Johnson, Sanitary Engineer, St. Louis Health Department; "Rural Electrification in Missouri," D. W. Snyder, Jr., Jefferson City, Mo., President, Missouri Power & Light Company; "Looking Backward to See Forward," Gardner S. Howland, Chicago, Ill., General Manager, Electric Shops, Commonwealth Edison Company; "Where Are We Going, and Why?" Louis H. Egan, St. Louis, Mo., President, Union Electric Light & Power Company; "Service," H. T. East, Chicago, Ill., Public Service Company of Northern Illinois; "Welcome to St. Louis," E. P. Gosling, St. Louis, Mo., President, Laclede Gas Light Company; "More Safety, Less Accidents," J. M. Strike, St. Joseph, Mo., St. Joseph Railway, Light, Heat & Power Company.

A Safety Meeting will open the convention on the afternoon of April 29. J. M. Strike, Chairman of the Accident Prevention Committee, will preside.

Five electric and gas companies have entered contestants in the Employees' Speaking Contest to be held on the evening of April 29. All employees are eligible, and contestants are being chosen by company eliminations. There will be separate contests for men and women. The subjects will be: For women, "The American Home — How the Utilities Help Build It"; for men, "The Utility's Part in the Development and Growth of the Community."

The entertainment program is being arranged by a committee under the chairmanship of Hermann Spoehrer, Union Electric Light & Power Company, St. Louis.